INSTALLATION AND MAINTENANCE INSTRUCTIONS

GROUND SOURCE HEAT PUMP (ALL IN ONE)

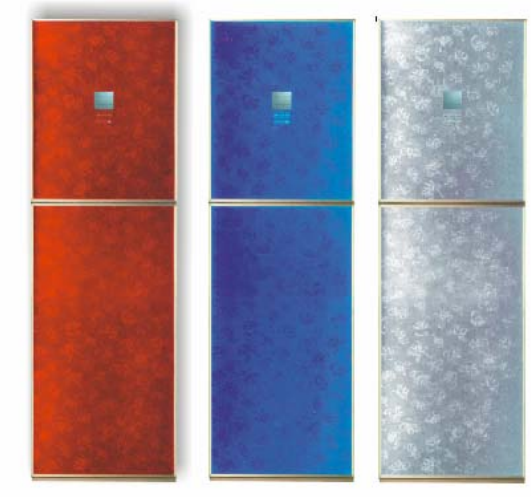
MODEL :

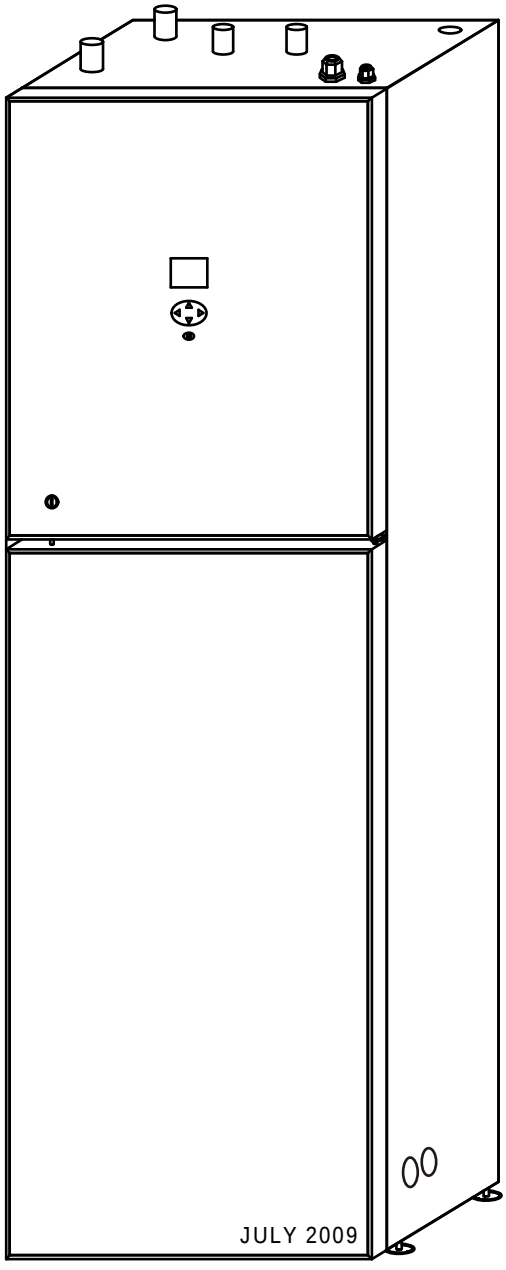
BWA-SS-6 BWA-SS-8

(230V / 50HZ)

BWA-SS-10 BWA-SS-12 BWA-SS-16

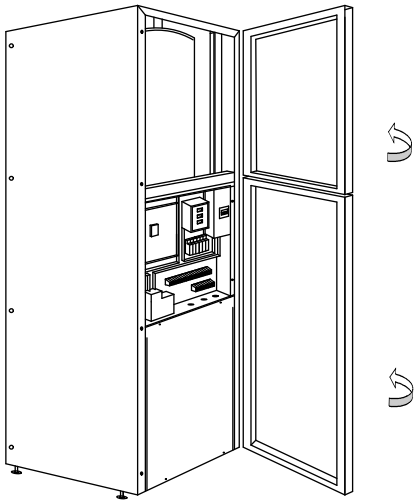
(3x400V / 3 / 50Hz)

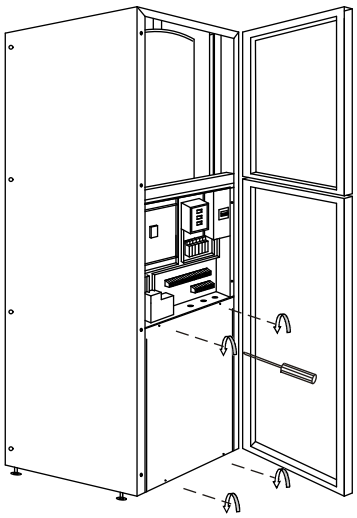


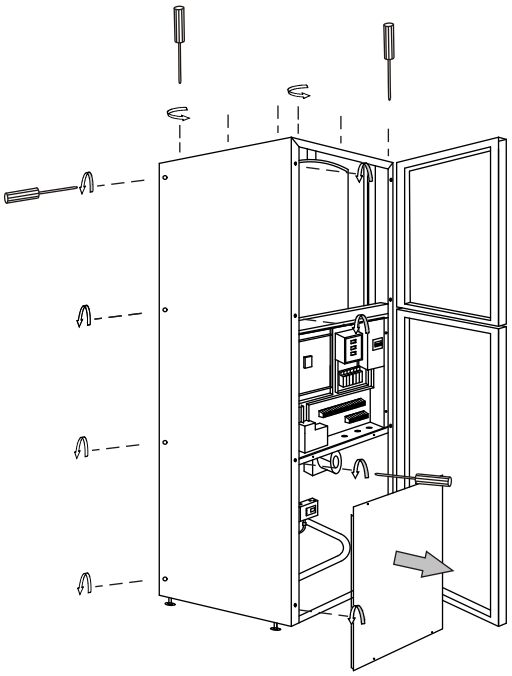


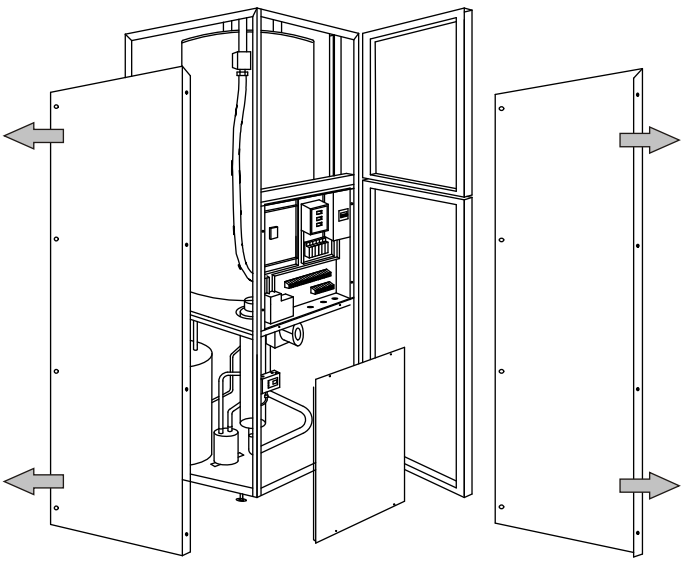
CE RoHS

• Please read this operation manual before using the Heat Pump









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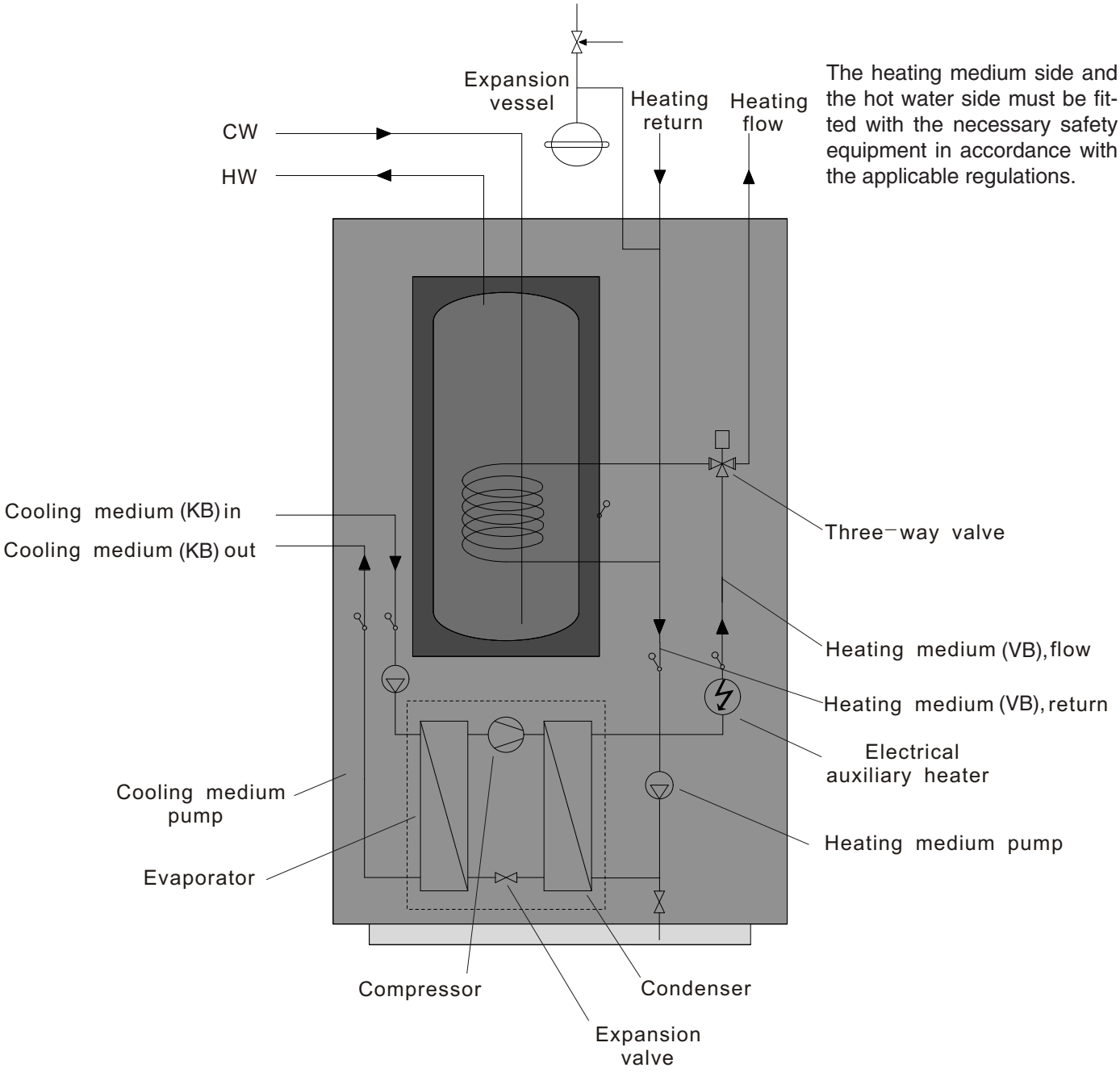
Principle of operation

BWA-SS series consists of a heat pump, water heater, electrical module, circulation pumps and a control system. BWA-SS series is connected to the collector and heating medium circuits.

The heat from the heat source (rock, soil, lake) is taken up via a closed collector system in which a mixture of water and antifreeze circulates. Groundwater can also be used as a heat source, but this requires an intervening heat exchanger.

The brine emits its heat to the refrigerant in the heat pump's evaporator. It then vaporises and is compressed in the compressor. The refrigerant, the temperature of which has now been raised, is passed to the condenser where it gives off its energy to the heating medium circuit and, if necessary, to the water heater. After the condenser there is a built-in electrical module which cuts in if there is a high demand.



The heating medium side and the hot water side must be fitted with the necessary safety equipment in accordance with the applicable regulations.

3 System description

Unit Description

In order to get the best results from the climate system BWA-SS series you should read through the section For the System manager in these Installation and Maintenance instructions.

BWA-SS series is a climate system for heating houses and apartment buildings as well as industrial properties. Ground, rock or lakes can be used as the heat exchange source.

BWA-SS series is a complete heating installation for heating and hot water.

It is fitted with new design on the market to be developed specifically for heat pumps. A new evaporator enables a new and improved circulation system for the refrigerant. The heat pump has an integrated 150 or 200 litre water tank and an immersion heater. The Tap Water Stratification system improves the efficiency of heat transfer by keeping the water in distinct thermal layers in the water tank.

The unit is fitted with a regulating computer, which is controlled over a graphic display unit.

Heat is distributed throughout the house over a hydronic heating system referred to as low temperature system with a maximal water temperature to radiators (supply line temperature) of 65°C. Most of the heating demand is taken care of by the heat pump (compressor unit), the auxiliary heater being started only when demands exceed available heat pump capacity.

BWA-SS series consists of five main components:

a. Heat Pump Unit
- Rotary or Scroll-compressor
- Stainless steel heat exchangers
- Circulation pumps for Brine system (brine) and heating systems
- Valves and safety equipment for refrigerant system, complete with necessary electric components

b. Water Heater
- 150 or 200 litre
- Lined with copper sheet against corrosion or made of stainless steel
- Maintenance free as no anode is used

c. Reversing Valve
- Opening or closing the connection to water heater according to operating mode: heating or warm water production

d. Auxiliary Heater
- 3 / 6 / 9 kW electric heating element
- Three-step capacity control
- Fitted on supply line
- Delivers back-up heat in case of great heat demand that exceeds heat pump capacity
- Starts automatically, provided operating mode “AUTO” has been selected

e. Regulating Equipment

The regulating system controls heat pump components (compressor, circulation pumps, auxiliary heater and reversing valve). Based on data received from sensors, it starts or stops heat pump operation and determines whether heating or warm water shall be produced. The system consists of:
- Control computer with graphic display unit
- Temperature sensors (outside air,room, supply line, return line,and Brine system)

Principle of heat pump

A heat pump can exploit the energy contained in natural heat sources. Or, to put it differently, the heat pump "collects" heat energy from the heat source. This makes the heat pump a very environmentally friendly and economically sound alternative for space heating.

a. A hose filled with liquid (Brine system) is immersed into a lake, dug into the ground or sunk into the rock. The Brine sytem absorbs the heat energy of the heat source so that the temperature of the water circulating in the hose is raised a few degrees.

b The Brine system is circulated to the heat pump's evaporator. Here the heat energy of the Brine system causes the refrigerant, circulating through the evaporator, to boil and turn into a gas – it evaporates.

c The refrigerant, having absorbed heat energy, is circulated to the compressor where pressure and temperature are raised.

d The refrigerant continues to the condenser. When condensing, it releases heat energy to the heat carrier, circulating through the condenser. The temperature of the refrigerant sinks, and it returns to its liquid state.

e The heat energy released is carried by the heating circuit to water heater and radiator or floor heating systems.

f At last the refrigerant is led through the expansion valve, where its pressure is reduced, and then continues to the evaporator The process is restarted.

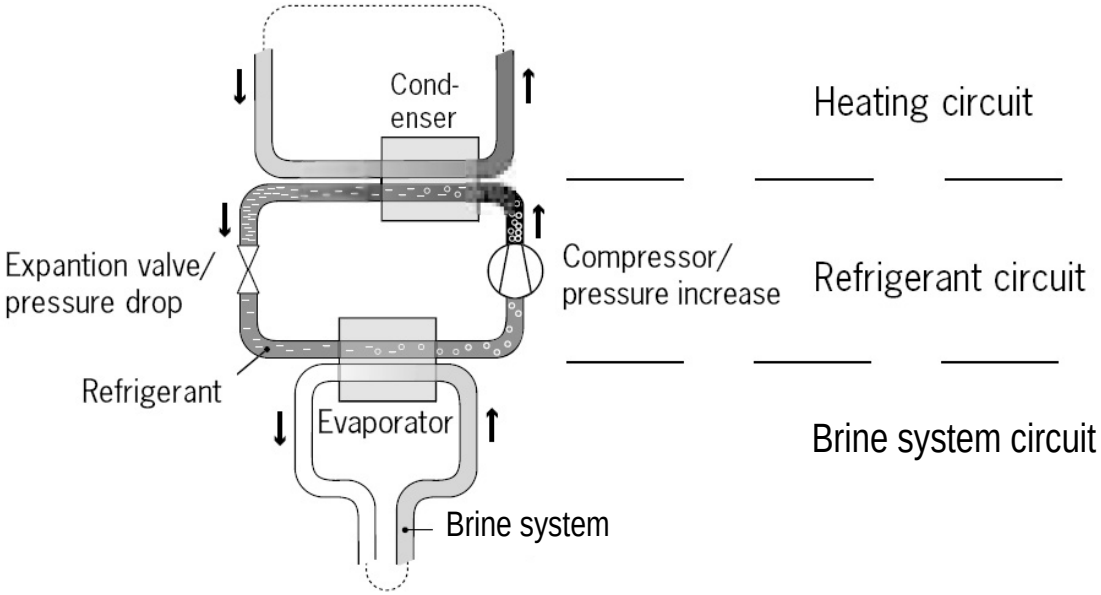
.

The heat pump has three separate liquid circuits

Brine system circuit – a water-based mixture (brine) transporting energy from heat source to heat pump.

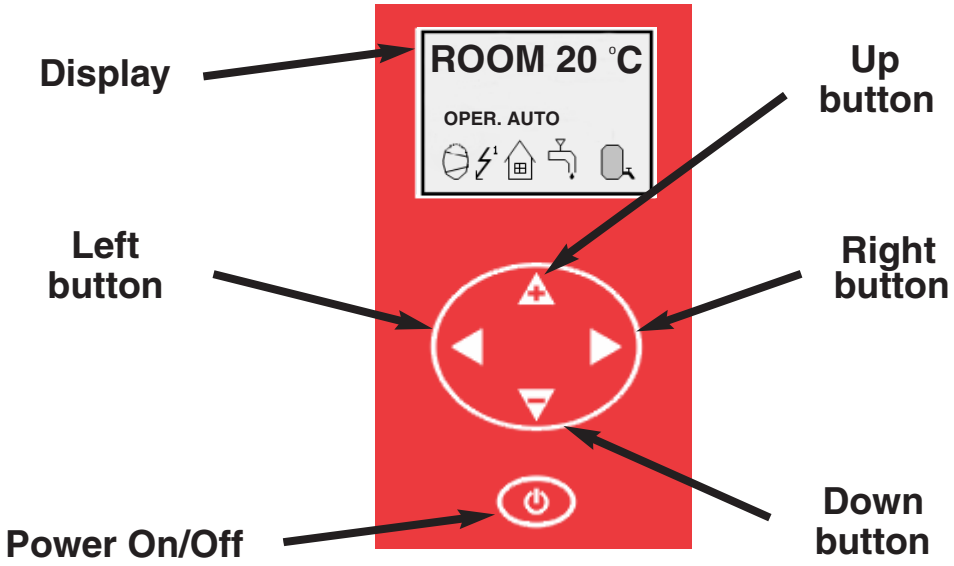
Refrigerant circuit – circulating inside the heat pump. Through evaporation, compression and condensation it absorbs energy from the Brine system and releases it to the heat carrier. The refrigerant is chlorine-free.

Heating circuit – water transporting heat energy to the heating system (radiators/floor coils) and the water heater.



5 Control panel

Layout



Explanation

Control Panel

The control panel of BWA-SS features a graphic display five control buttons .

Beside the control panel you will find the User's Manual, a short description of how to increase and reduce room temperature, and a label with name and phone number of dealer.

Graphic display

Functions

The control computer is operated with the help of a user friendly menu system that is displayed on the control panel. There is a main menu and four sub-menus accessible from the main menu. The menus are described in detail further down.

To be able to select the desired menu and increase or reduce preset values, you will use the five buttons.

- One button pointing upwards marked with a plus
- One button pointing downwards marked with a minus
- One button pointing to the right
- One button pointing to the left
- One button pointing to the Power ON/OFF

Symbols

For you to know at a glance the actual operating mode of the heat pump, one of the following symbols will be shown in the lower part of the display depending on which part of the unit is working:

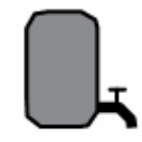
The heat pump is running.

Warm water is being produced.

The auxiliary heater is activated.
The figure next to the symbol indicates capacity step.

Indicates the status of warm water production. If the symbol is empty, warm water temperature is under the setting temperature.

There is a room heating demand.

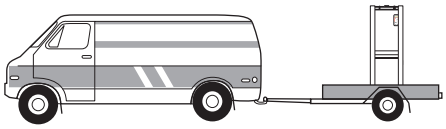


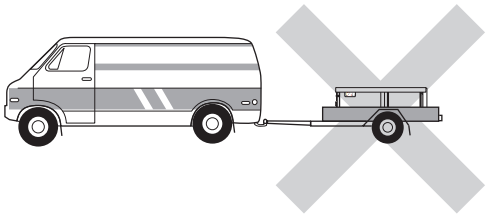
If the symbol is full, warm water temperature reached to the setting temperature

7 General information for the installer

Transport and storage

The BWA-SS series must be transported and stored upright and dry. The BWA-SS series may however be carefully laid on its back when being moved into a building.





Installation

BWA-SS series is placed on a firm base, preferably a concrete floor or foundation. Install BWA-SS series with its back to an outside wall, ideally in a room where noise does not matter. If this is not possible, avoid placing it against a wall behind a bedroom or other room where noise may be a problem. Any wall that backs on to a bedroom should be fitted with sound insulation. Route pipes so they are not fixed to an internal wall that backs on to a bedroom or living room.

Guideline values for collectors

Type	Surface soil heat, recommended collector length	Rock heat, recommended active drilling depth
6	250 – 400 m	90 – 110 m
8	325 – 2x250 m	120 – 140 m
10	400 – 2x300 m	140 – 170 m
12	2x250 – 2x350 m	160 – 190 m
16	2x250 – 2x350 m	180 – 210 m

For use with 40 x 2.4 PN 6.3 PEM hose.

The length of the collector hose varies depending on the rock /soil conditions and on the heating system, i.e. radiators or floor heating.

Max length per collector should not exceed 400 m.

Where there is more than one collector, they must be connected in parallel, with a means of adjusting the flow.

For surface soil heat, the hose should be buried at a depth of about 1 metre and the distance between the hoses should be at least 1 metres.

For several bore holes, the distance between the holes must be at least 15m.

Inspection of the installation

Current regulations require the heating installation to be inspected before it is commissioned. The inspection must be carried out by a suitably qualified person and should be documented. The above applies to closed heating systems. If the heat pump is replaced, the installation must be inspected again.

Pipe connections 8

General

Pipe installation must be carried out in accordance with current norms and directives. The heat pump can operate up to a return temperature of about 58* °C and an outgoing temperature of about 70* °C from the heat pump. The compressor produces up to 65* °C, the rest is obtained using additional heating.

The other heat pumps has a max return temperature of approximately 50 °C and an outgoing max temperature from the heat pump of approximately 60 °C.

Since the BWA,BWB series is not fitted with shut-off valves, these must be fitted outside of the heat pump to make future servicing easier.

During assembly the pipes for the heat medium and water heater and possibly hot water circulation are routed backwards. The distance between BWA-SS series and the wall ought to be 50 mm.

NOTE!

The pipe system needs to be flushed out before the heat pump is connected so that debris cannot damage component parts.

Pipe connections (collector)

Factors to be taken into account when designing the collector layout are geographical position, type of rock/soil and cover factor of the heat pump.

When installing the collector hose ensure it rises constantly towards the heat pump to avoid air pockets. If this is not possible, install high points to vent the air.

All collector pipes in heated rooms must be insulated against condensation. The level vessel (NK) must be installed as the highest point in the collector system and on the incoming pipe before the brine pump. Note that condensation may drip from the level vessel. Position the vessel so that this does not harm other equipment.

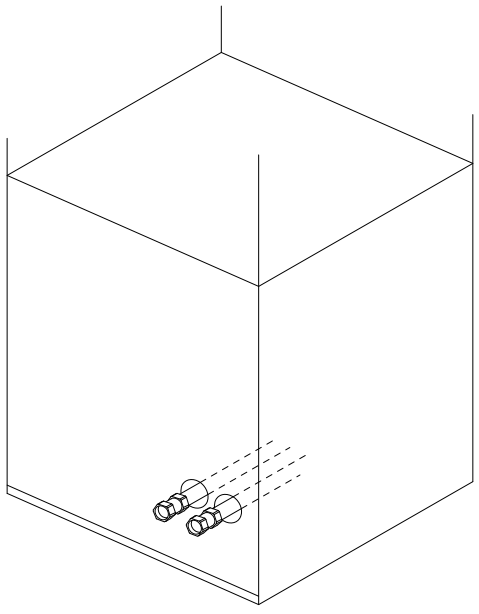
As the temperature of the collector system can fall below 0 °C it must be protected against freezing down to -15 °C. One litre of ready mixed brine per meter of collector hose (applies when using PEM-hose 40 x 2.4 PN 6.3) is used as a guide value when making the volume calculation.

Details of the antifreeze used must be shown on the level vessel.

The collector circuit may be connected from the left or from the right. The lower side panels are swapped over to suit the chosen connection option. The enclosed connecting pipes for the brine are secured using the clips in the punched tabs that are folded down on the side in question.

Shut-off valves should be installed as close to the heat pump as possible. Fit the supplied particle filter on the incoming pipe.

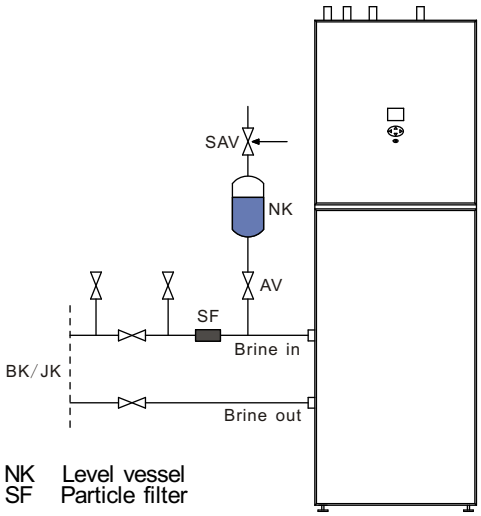
In the case of connection to an open groundwater system, an intermediate frost-protected circuit must be provided, because of the risk of dirt and freezing in the evaporator. This requires an additional heat exchanger.



Pipe connections (heating medium)

Pipe connections for the heat medium side are made at the top. All required safety devices, shut-off valves (as close to the heat pump as possible), and particle filter (supplied) are fitted.

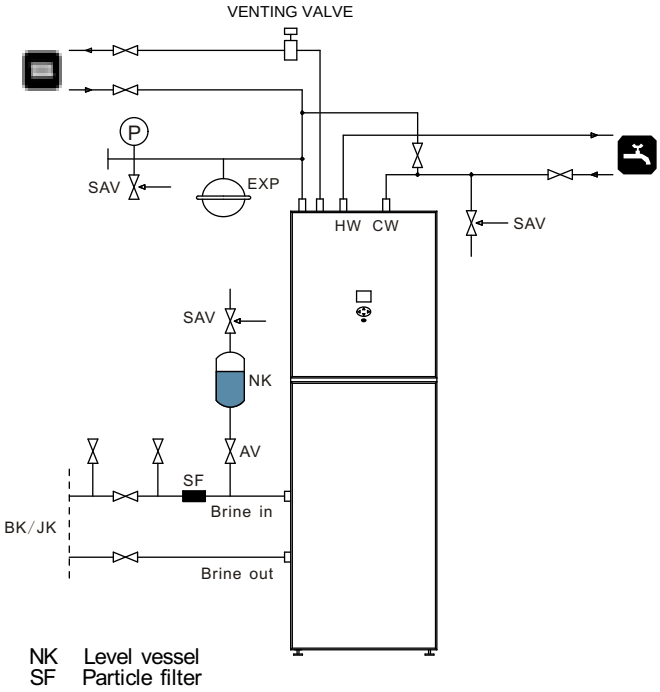
When connecting to a system with thermostats on all radiators, a relief valve must be fitted, or some of the thermostats must be removed to ensure sufficient flow.



NK Level vessel
SF Particle filter

Pipe connections (water heater)

The heat pump´s water heater must be fitted with the necessary valve equipment.



NK Level vessel
SF Particle filter

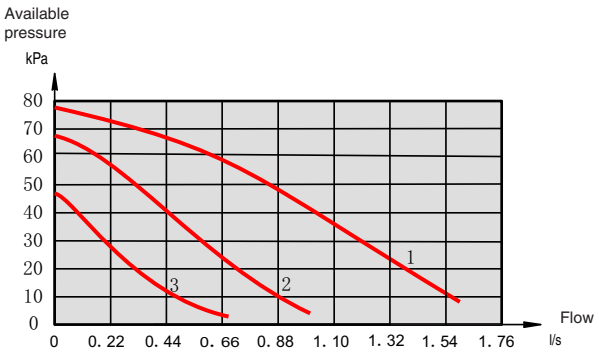
The heat pump should be supplemented with an electric water heater if a bubble pool or other significant consumer of hot water is installed. The valve coupling in COMPACT (electrical water heater) can be divided. The mixing valve stays in COMPACT and the remaining valve coupling can be used for incoming cold water in BWA-SS series.

NOTE!

The venting valve should be set on the top of the heating medium system.

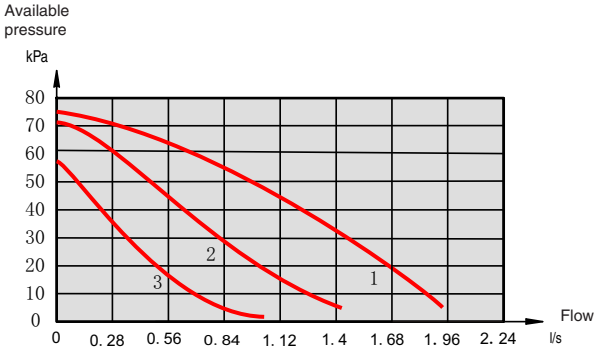
Pump capacity diagrams, heating medium side

BWA-SS-6 BWA-SS-8 BWA-SS-10 BWA-SS-12



WILO RS-25/8

BWA-SS-16



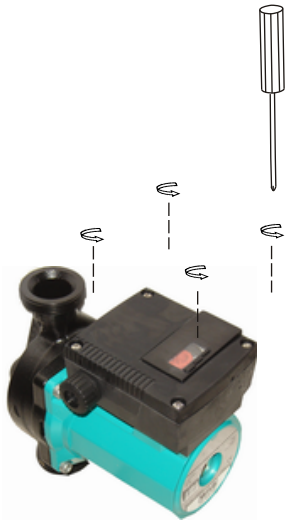
WILO RL-25/7.5

How to adjust the rate of flow

WILO RS-25/8

The pump is adjustable to adjust the flow: 1, 2, or 3.

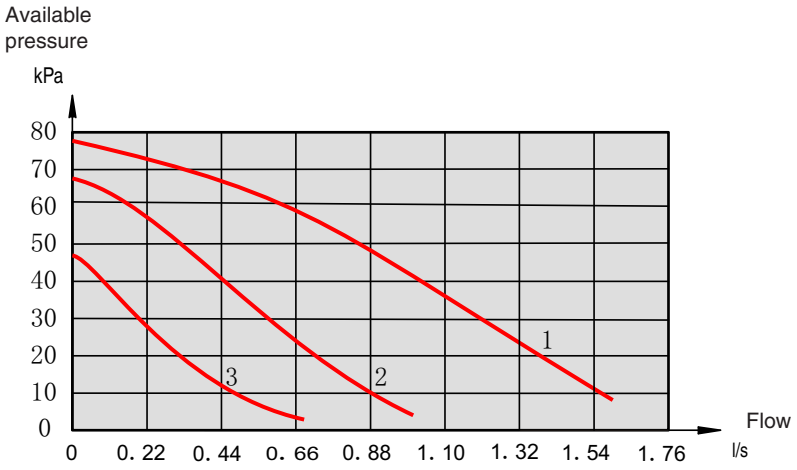
WILO RL-25/7.5



The pump is adjustable to adjust the flow: 1, 2, or 3.

Pump capacity diagrams, collector side

BWA-SS-6 BWA-SS-8 BWA-SS-10 BWA-SS-12 BWA-SS-16

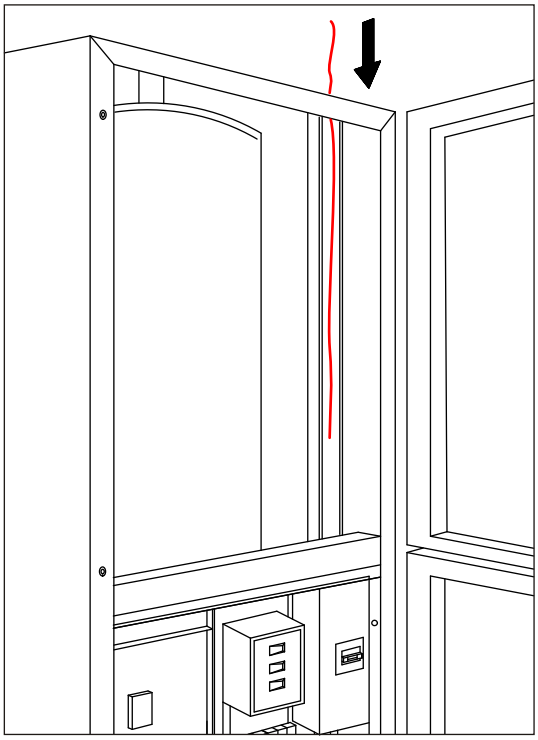


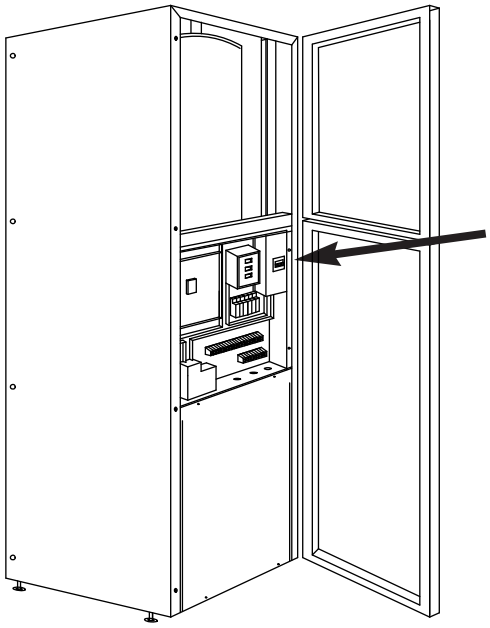
WILO RS-25/8

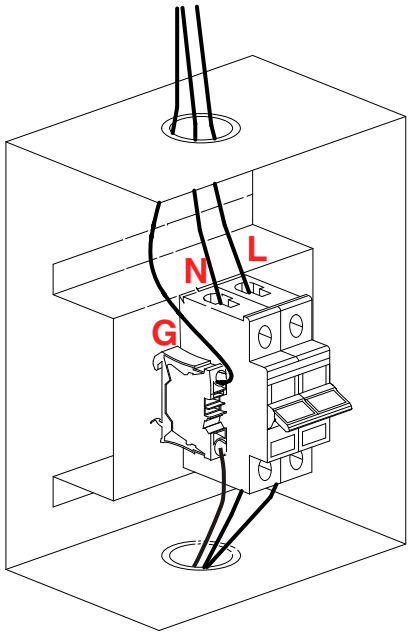
WILO RS-25/8

The pump is adjustable to adjust the flow: 1, 2, or 3.

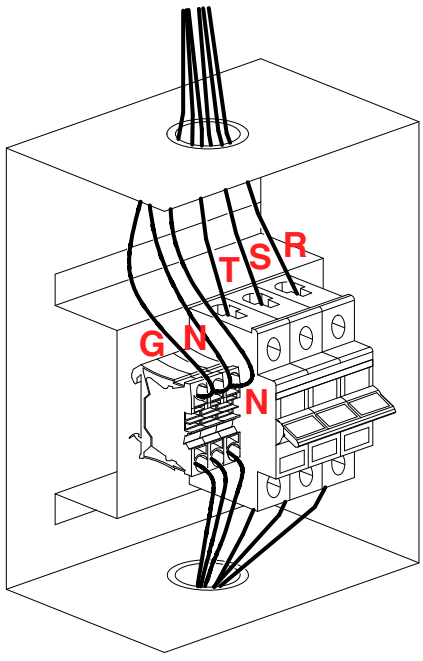
Connect the power cord







(230V / 50 HZ)

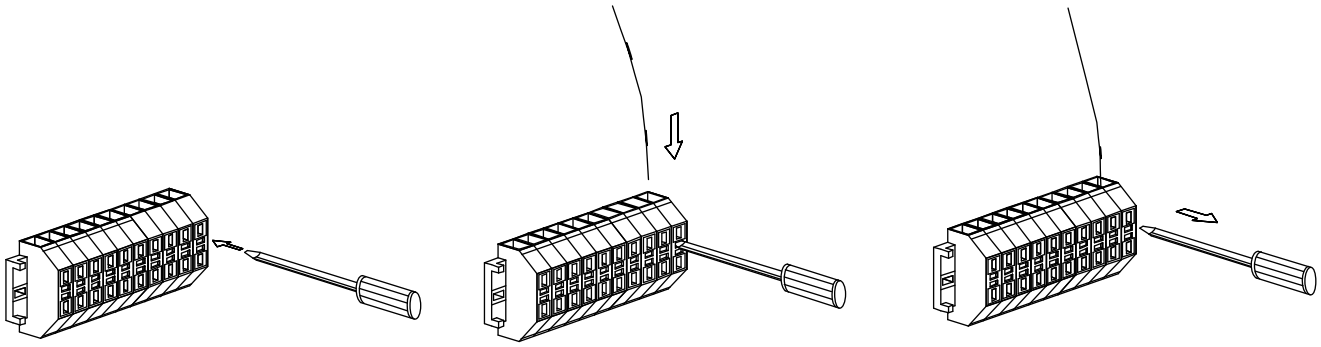


(3X400V / 3 / 50 HZ)

NOTE!

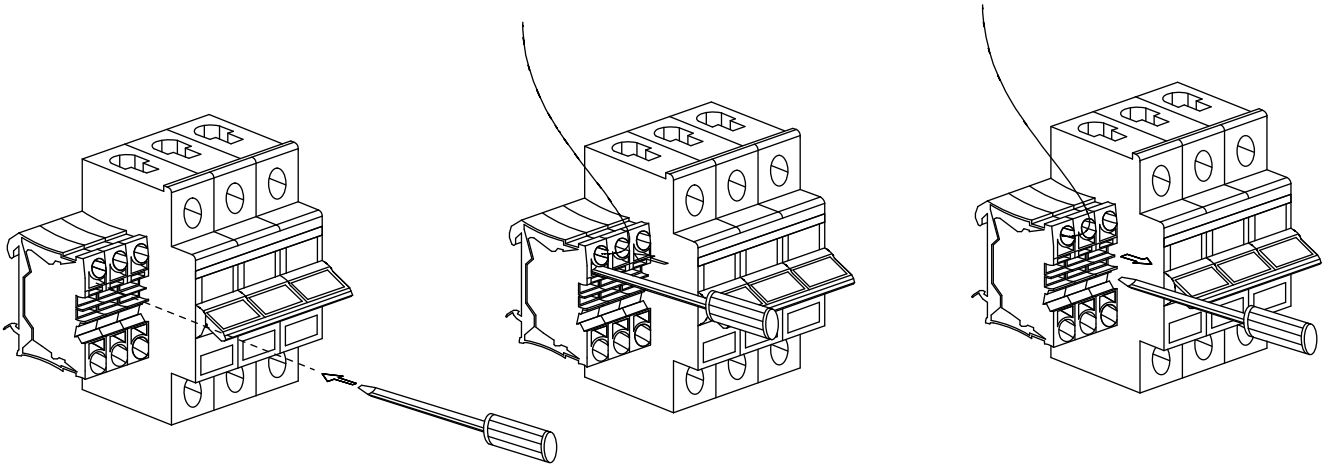
Electrical installation and service must be carried out under the supervision of a qualified electrician in accordance with the stipulations in force.

Wiring of the terminal (mode one)



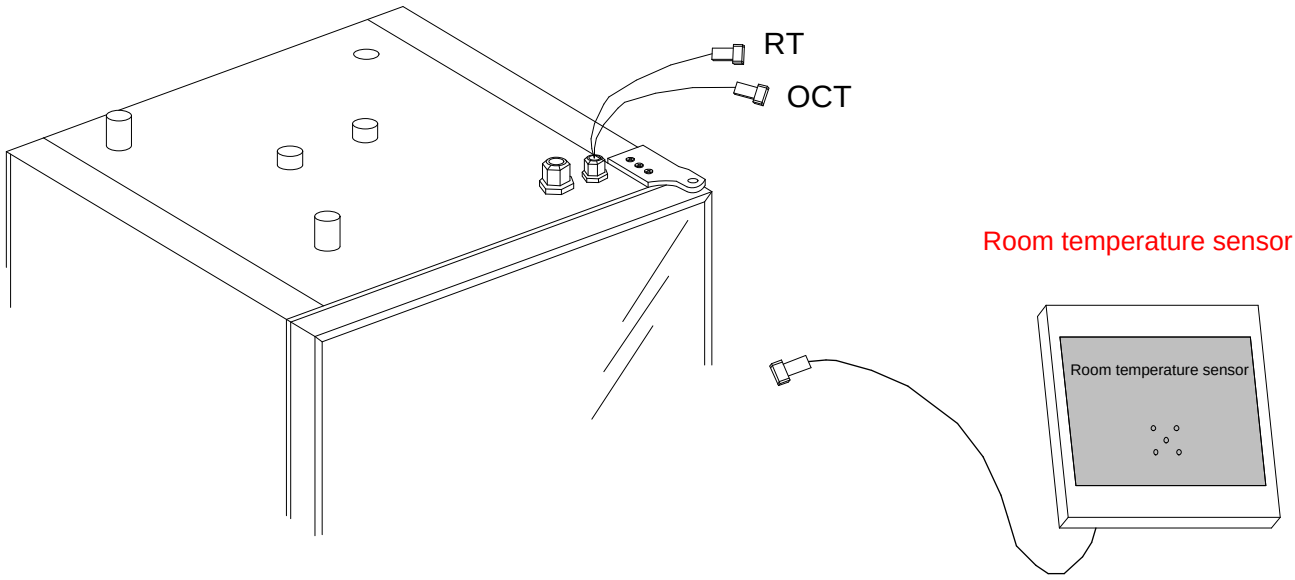
Step1 Step2 Step3

Wiring of the terminal (mode two)



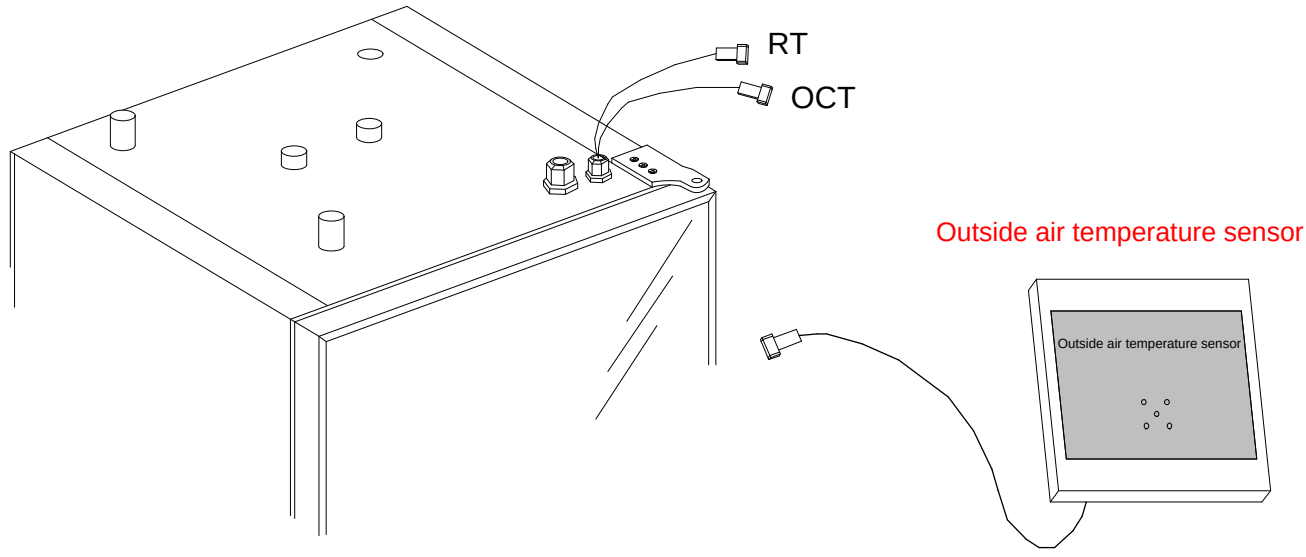
Step1 Step2 Step3

Connecting The Room Temperature Sensor



RT=Room temperature sensor

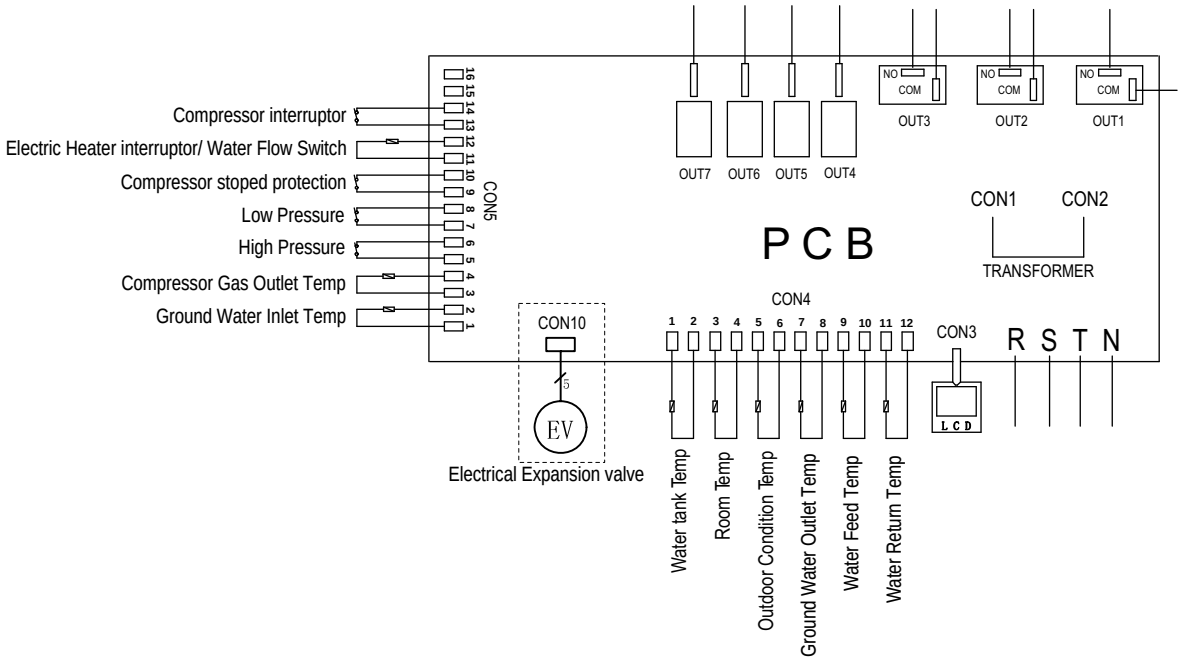
Connecting The Outside Temperature Sensor



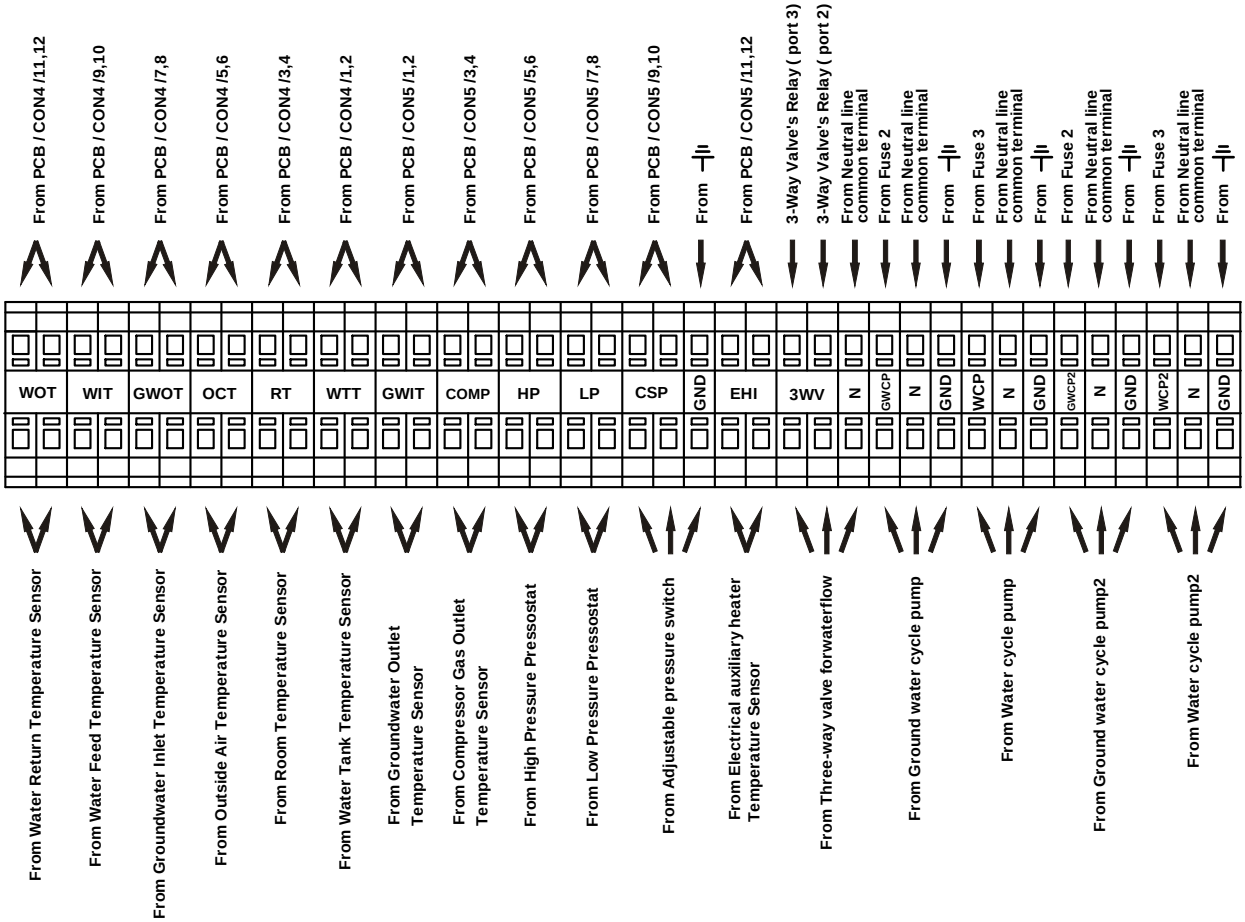
OCT=Outside air temperature sensor

Electrical connection

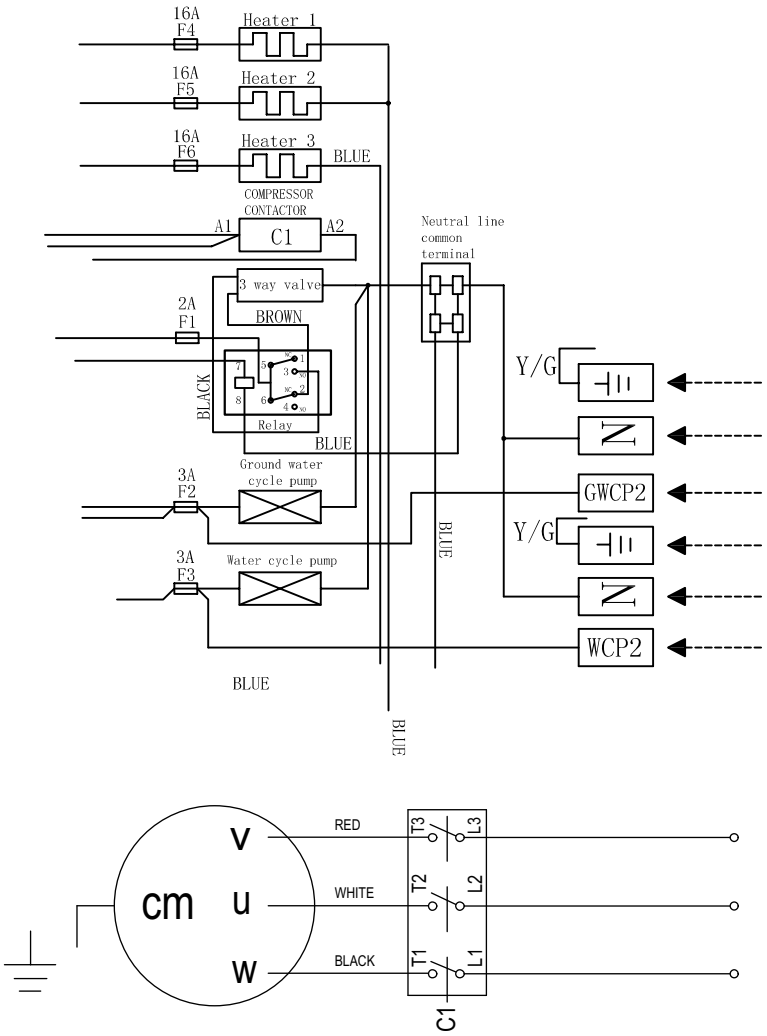
Layout of the PCB



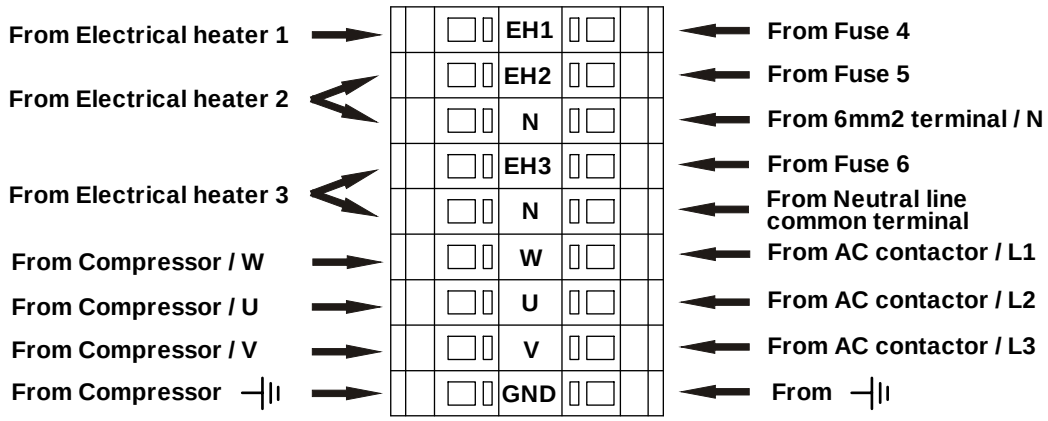
1.5mm2 terminal connection


From PCB / CON4 /11,12
From PCB / CON4 /9,10
From PCB / CON4 /7,8
From PCB / CON4 /5,6
From PCB / CON4 /3,4
From PCB / CON4 /1,2
From PCB / CON5 /1,2
From PCB / CON5 /3,4
From PCB / CON5 /5,6
From PCB / CON5 /7,8
From PCB / CON5 /9,10
From
From PCB / CON5 /11,12
3-Way Valve's Relay (port 3)
3-Way Valve's Relay (port 2)
From Neutral line common terminal
From Fuse 2
From Neutral line common terminal
From
From Fuse 3
From Neutral line common terminal
From
From Fuse 2
From Neutral line common terminal
From
From Fuse 3
From Neutral line common terminal
From
WOT WIT GWOT OCT RT WTT GWIT COMP HP LP CSP GND EHI 3WV N GWCP N GND WCP N GND GWCP2 N GND WCP2 N GND
From Water Return Temperature Sensor
From Water Feed Temperature Sensor
From Groundwater Inlet Temperature Sensor
From Outside Air Temperature Sensor
From Room Temperature Sensor
From Water Tank Temperature Sensor
From Groundwater Outlet Temperature Sensor
From Compressor Gas Outlet Temperature Sensor
From High Pressure Pressostat
From Low Pressure Pressostat
From Adjustable pressure switch
From Electrical auxiliary heater Temperature Sensor
From Three-way valve forwaterflow
From Ground water cycle pump
From Water cycle pump
From Ground water cycle pump2
From Water cycle pump2

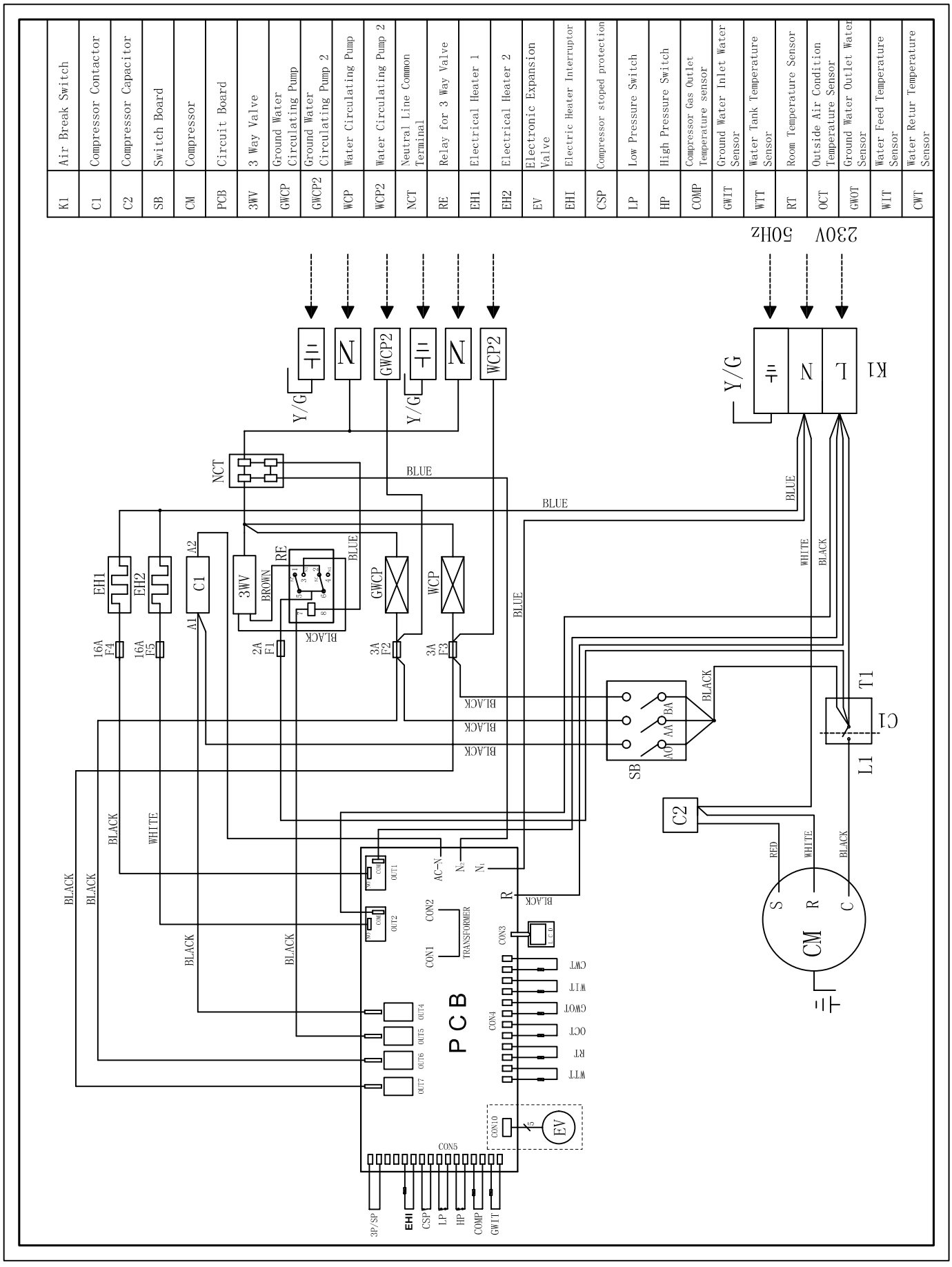
Part of wiring diagram



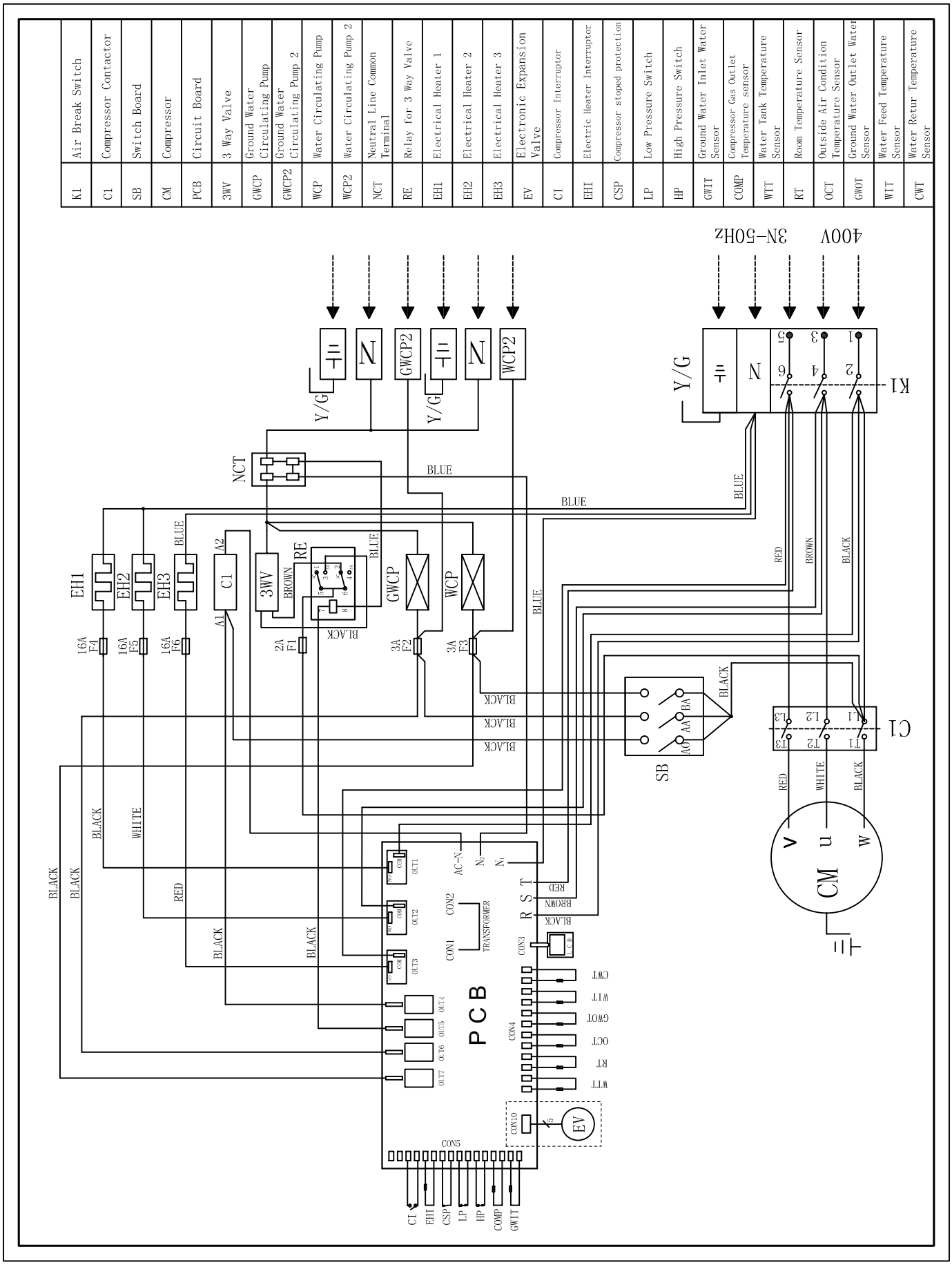
2.5mm2 terminal connection



Wiring Diagram(230V / 50 HZ)



Wiring Diagram (3X400V / 3 / 50 HZ)



Preparations

Before starting up the system, check that the heating, collector and hot water circuits are full and thoroughly vented. Check the pipe system for leakage.

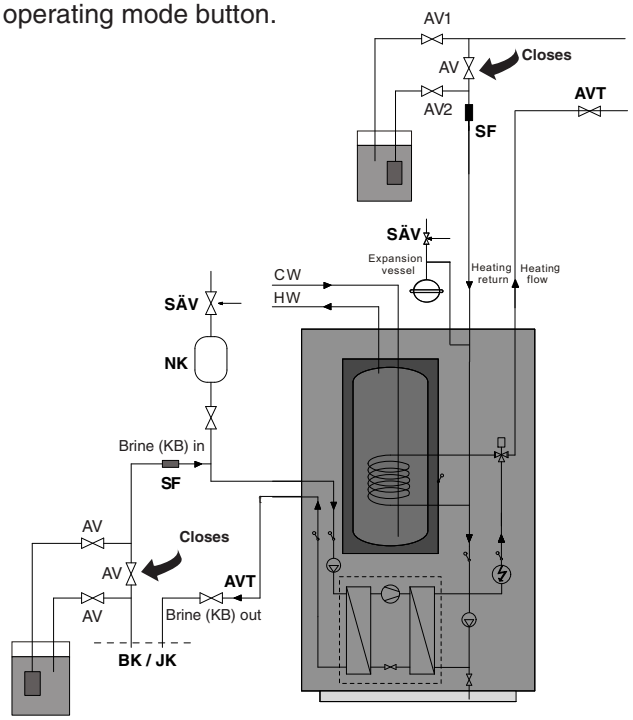
Filling and venting the collector system

When filling the brine system mix the water with antifreeze in an open container. The mixture should be protected against freezing down to about -15 °C. The brine is filled by connecting a filling pump.

1. Check the brine system for leakage.
2. Connect the filling pump and return line on the brine's system's service connections as shown in figure.
3. Close the valve under the level vessel.
4. Close the valve between the service connections.
5. Open the valves on the service connections.
6. Start the filling pump, and fill until there is fluid in the return pipe.
7. Press the power ON botton on the control panel. and start the heating medium pump.
8. The filling pump and the heat pump's brine pump are now operational.
   The fluid should circulate via the mixing container until it emerges from the return hose without being mixed with air.
9. Stop the filling pump and clean the particle filter.
10. Start the filling pump, open the valve between the service connections.
11. Close the valve on the service connection's return line. Now pressurise the system (to max 3 bar) with the filling pump.
12. Close the valve on the service connection closest to the level vessel.
13. Stop the filling pump.
14. Fill the level vessel with liquid up to around 2/3.
15. Open the valve below the level vessel.
16. Select the auto operating mode using the operating mode button.

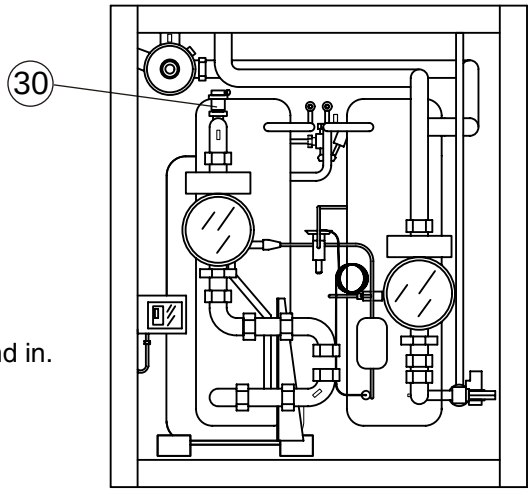
Filling the heating medium system

1. Check the heating medium system for leakage.
2. Connect the filling pump and return line on the heating system's service connections as shown in figure.
3. Close the valve between the service connections.
4. Open the valves on the service connections(AV1,AV2).
5. Pushing the white manual lever down to bottom (this has already been done when the machine leaves factory), then three way valve's water tank port is closed (the "B" port), room heat port is open (the "A" port).
6. Start the filling pump, and fill until there is fluid in the return pipe.
7. Open up Power ON from control panel to start machine, then heat medium water pump is running, the valve will return to the up position when power is restored.
8. Firmly pushing the white manual lever down to midway and in. in this position both the 'A' and 'B' ports are open.
9. The filling pump and the heating medium pump are now operational. The fluid should circulate via the container with tap water until it emerges from the return hose without being mixed with air.
10. Stop machine, heat medium water pump stop running. Depressing the white manual lever lightly and then pulling the lever out, pushing the while manual lever down to bottom position, and then "A" port open, "B" port is closed.
11. Stop the filling pump and clean the particle filter.
12. Start the filling pump, open the valve between the service connections.
13. Close the valve on the service connection's return line. Now pressurise the system (to max 3 bar) with the filling pump.
14. Close the valve (AV2) on the service connection.
15. Stop the filling pump.
16. Select the auto operating mode using the operating mode button.



AVT	Draining	SF	Particle filter
SÄV	Safety valve	BK	Rock collector
CW	Cold water	JK	Soil collector
NK	Level vessel	HW	Hot water

Internal air vent valve, brine



Inspection

Adjust the brine and the heating medium pump

1). Read the brine temperatures on the panel. The difference between these two temperatures should be 2—5 °C when the system has come into balance. Adjust the flow with the knob on the brine pump (32). A high difference indicates a low brine flow. A low difference indicates a high brine flow.

The pump is adjustable to adjust brine flow.

2). Check the flow temperature and the return return temperature on the panel. The difference between these two temperatures, with floating condensing, should be 5 — 10 °C when the house is being heated without additional heat. Adjust the flow with the knob on the heating medium pump (37). A high difference could depend on a low heat medium flow. A low difference indicates a high heat medium flow.

The pump is adjustable to adjust heat medium flow.

NOTE!

The compressor must not be forced to start with periods shorter that 1 start per 15 minutes.

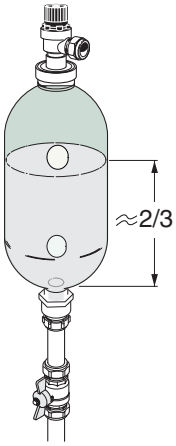
Readjusting, heat medium side

Air is initially released from the hot water and venting may be necessary. If bubbling sounds can be heard from the heat pump, the entire system requires further venting. When the system has stabilised (correct pressure and all the air removed) the heating controls can be set at the required values.

Readjusting, collector side

Check the fluid level in the level vessel (85). If the level has dropped, close the valve under the vessel. You can then fill through the connection at the top of the vessel. After filling, open the valve again.

To raise the pressure, close the valve on the incoming main pipe when the brine pump (KBP) is running and the level vessel (NK) is open, so that water is drawn in from the vessel.



Emptying the water heater

The siphon principle is used to empty the water heater. This can be done either via the drain valve on the incoming cold water pipe or by inserting a hose into the cold water connection.

General information

Menu Navigation

The right-hand button on the control panel is used to open the desired menu. The left-hand button is used to return to the previous menu. The up and down buttons are used to navigate between the parameters of a menu. A cursor (arrow) on the left-hand side of the display indicates which menu can be opened. The up and down buttons are also used if you wish to increase or reduce a preset value.

Display of current operating mode

During normal operation, the following information will be displayed:

- Desired (preset) room temperature
- Whether there is a heating demand or not. If there is, there will also be symbols telling which heat source is working– heat pump or auxiliary heater or both (see ”Symbols” on page 6).

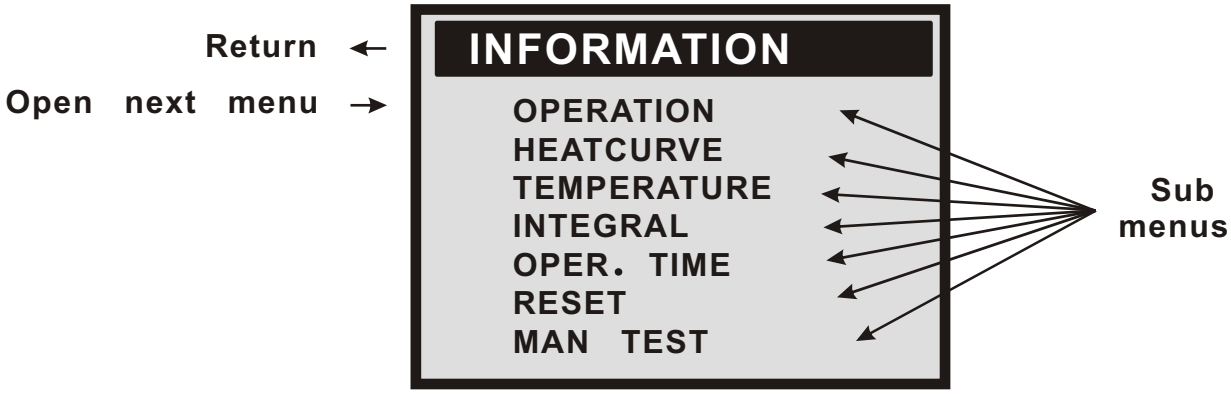
- Which operating mode has been selected In addition to this, the following messages may be displayed:
- POWER SUPPLY

The compressor in the heat pump is running in the wrong direction, which means that heat is produced by the auxiliary heater only (see ”Alarm” on page 38).

Menus

Main Menu INFORMATION

To open the main menu INFORMATION, press the right- or left-hand button once.

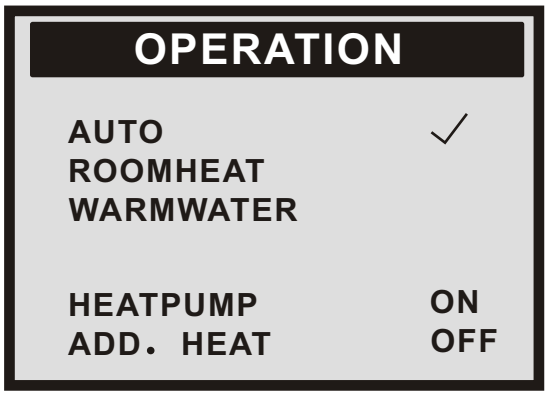


To select the desired sub-menu use the up or down button.

Open the menu by pressing the right-hand button once.

To return to the main menu, press the left-hand button once.

Sub-Menu OPERATION



This menu is used for the selection of operating mode. The control system allows for five different operating modes:

- OPERATION HEAT PUMP ON
  Heat pump (compressor) operation is allowed by the control system.
- OPERATION HEAT PUMP OFF
  Heat pump (compressor) operation is not allowed by the control system.
- OPERATION ADD.HEAT ON/OFF
  The auxiliary heater will/will not be allowed to operate. This operating mode is normally used when a new installation is being put into service, before the Brine system is ready for use.
- OPERATION AUTO
  Heat pump and auxiliary heater are regulated automatically by the control system. The text "OPERATION AUTO" will be displayed on the control panel.
- OPERATION ROOMHEAT
  The heat pump will be distributed to the heating system only; The heat pump will not produce warm water. The text "OPERATION WARMWATER" will be displayed on the control panel.
- OPERATION WARMWATER
  The heat pump will only produce warm water; no heat will be distributed to the heating system. The text "OPERATION WARMWATER "will be displayed on the control panel.

Menus

- OPERATION OFF

  Heat pump is turned off. The following text is displayed on the control panel: “OPERATION OFF“

  If the heat pump will be put in OPERATION OFF mode during winter, please remember to let out all the water the heating system to avoid any damage caused by freezing.

If you wish to change operating mode:

a. Open the main menu INFORMATION by pressing the right-hand button once. You will find the sub-menu named OPERATION.

b. Open the OPERATION menu by pressing the right-hand button once.

c. Select the desired mode by pressing either the ”up” or ”down” button.

d. Return to the main menu by pressing the ”up” button until to the top,and press left-hand button twice.

Sub-Menu HEAT CURVE

This menu is used for making adjustments that affect the room temperature.For more information, please refer to ”Adjustments to be made regularly” on page 28.

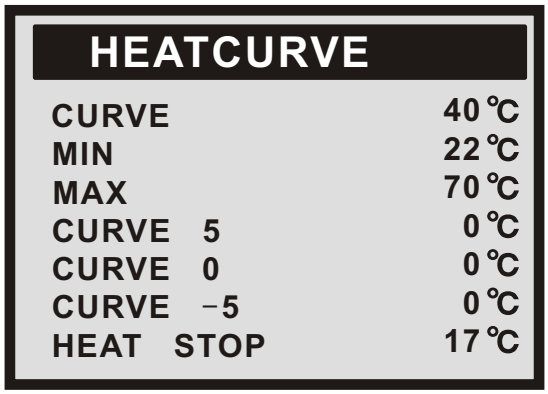


Table 1: Menu– HEAT CURVE

Menu Text	Description	Adjustable by:
CURVE	The value entered shows the temperature of the water to be distributed to the radiators(supply line temperature) when the outside air temperature is 0°C.	User (see”Adjustment of CURVE value” on p. 29)
MIN	Adjustment of value for lowest supply line temperature allowed.	User (see ”Adjustment of MIN and MAX values” on p. 32)
MAX	Adjustment of value for highest supply line temperature allowed.	User (see ”Adjustment of MIN and MAX values” on p. 32)
CURVE 5	Adjustment of room temperature when the outside air temperature is +5°C.	User (see ”Adjustment of CURVE value” on p. 32)
CURVE 0	Adjustment of room temperature when the outside air temperature is 0°C.	User (see ”Adjustment of CURVE value” on p. 32)
CURVE – 5	Adjustment of room temperature when the outside air temperature is -5°C.	User (see ”Adjustment of CURVE value” on p. 32)
HEAT STOP	Production of radiator heat is stopped when outside air temperature is equal to or higher than the value for heat stop entered	User, if require

Menus

Sub-Menu TEMPERATURE

This menu shows the different temperatures of the heating system. All temperature changes registered over the last 60 minutes are stored in the control system and can be viewed in the shape of graphs.

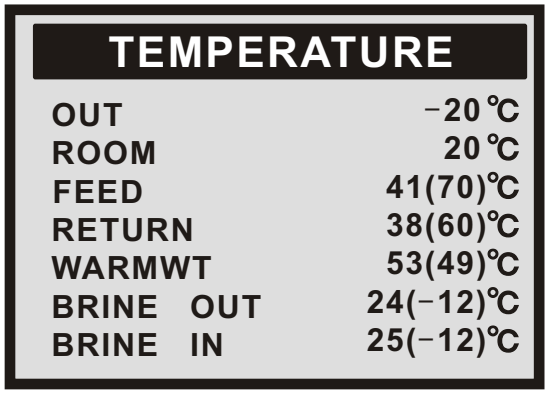
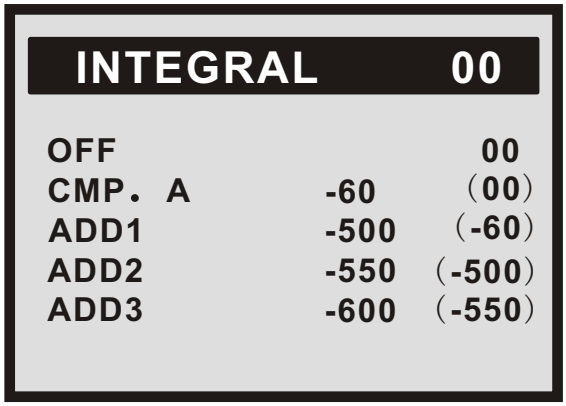


Table 2: Menu TEMPERATURE

Menu Text	Description	Adjustable by:
OUT	Outside air temperature	-------
ROOM	Desired (setpoint) room temperature	User (see "Adjustment of ROOM value" on page 31).
FEED	Actual (measured) supply line temperapture of heating system; in brackets the setpoint (desired) value.	User (The temperature necessary to keep the desired room temperature is determined by the control system).
RETURN	Measured return line temperature of heating system; in brackets the maximum return temperature allowed.	Installation contractor.To be adapted to each individual unit
WARMWT	Measured warm water temperature; in brackets the starting temperature for warm water production.	adjustable.
BRINE IN	Temperature of Brine sytem when entering the heat pump.	Not adjustable.
BRINE OUT	Temperature of Brine sytem when leaving the heat pump.	Not adjustable.

Sub-Menu INTEGRAL



Menus

Menu Text	Description	Adjustable by:
OFF	When the value (testing) reaches the value setting by user, the system will be closed.	USER
CMP.A	When the value (testing) reaches the value setting by user, the compressor will be start-up.And the value(testing) under the value(setting),the compressor will be closed.	USER
ADD1	When the value (testing) reaches the value setting by user, the ADD1 will be start-up.And the value(testing) under the value(setting),the ADD1 will be closed.	USER
ADD2	When the value (testing) reaches the value setting by user, the ADD2 will be start-up.And the value(testing) under the value(setting),the ADD2 will be closed.	USER
ADD3	When the value (testing) reaches the value setting by user, the ADD3 will be start-up.And the value(testing) under the value(setting),the ADD3 will be closed.	USER

Degree Minute's(DM) instruction

Degree Minute = The corresponding value of temperature difference between the actual water supply and the desired water supply X time (through **integral** to change; every minute for a cumulative)

Temperature difference between the actual water supply and the desired water supply (℃)	The corresponding value
-31 ~ -40	-40
-21 ~ -30	-30
-11 ~ -20	-20
-1 ~ -10	-10
1 ~ 10	10
11 ~ 20	20
21 ~ 30	30
31 ~ 40	40

For example:
(Under desired temperature)
Actual water supply temperature decrease 1℃ (under desired temperature) in 1 minutes,
Degree Minute=-10 X 1= -10;
Actual water supply temperature continue decrease 2℃(under desired temperature) in another 1 minutes,
Degree Minute=-10 X 1 + (-10) = -20;
Actual water supply temperature continue decrease 3℃(under desired temperature) in another 1 minutes,
Degree Minute=-10 X 1 + (-20) = -30;
Actual water supply temperature continue decrease 4℃(under desired temperature) in another 1 minutes,
Degree Minute=-10 X 1 + (-30) = -40;
……

Degree Minute′s(DM) instruction

Before the Degree Minute reach - 60 (adjustable) ,the compressor is off, but when the Degree Minute reach - 60 (adjustable) ,the compressor automatic start,and the flow temperature will begin increase.

(Higher than desired temperature) when the actual water supply temperature reach / higher than the desired temperature, the DM will be changed.

For example : the DM was cumulated to -160 in this time.

1 minutes later when the actual water supply temperature higher than desired temperature for 1℃. 10X1=10 ,Degree Minute= -150;

Another 1 minutes later when the actual water supply temperature higher than desired temperature for 2℃. 10X1=10,Degree Minute=-140;

Another 1 minutes later when the actual water supply temperature higher than desired temperature for 3℃. 10X1=10,Degree Minute=-130;

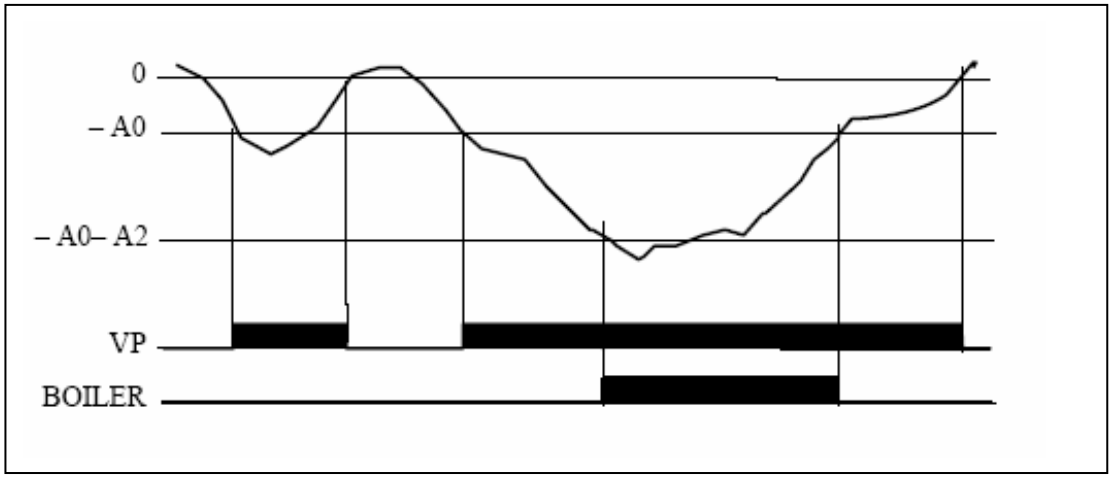
Another 1 minutes later when the actual water supply temperature higher than desired temperature for 4℃. 10X1=10,Degree Minute=-120;

……

Compressor off when Degree Minute reach 0 (adjustable) .

The relationship between compressor and DM

The relationship between compressor (on and off) and DM,the relationship between heater(on and off) and DM.



The above diagram describe the relationship between compressor (on and off) and Degree Minute, the relationship between heater(on and off) and Degree Minute.

Compressor ‘s Degree Minute are :-60 (on) and 0(off),A0=-60 (on)

Heater 1’s Degree Minute are : ‘-500’(on) and ‘-60’(off), A0+A2=-60-440=-500 (on)

Heater 2’s Degree Minute are : ‘-500’(on) and ‘-500’(off)

Heater 3’s Degree Minute are : ‘-600’(on) and ‘-550’(off)

When ambient temperature more than 6℃,heater can not automatic start

When flow temperature less than 15℃, heater can start at once,and the sequence of three heaters’ start will extremely follow own Degree Minute.

Menus

Sub-Menu OPERATING TIME

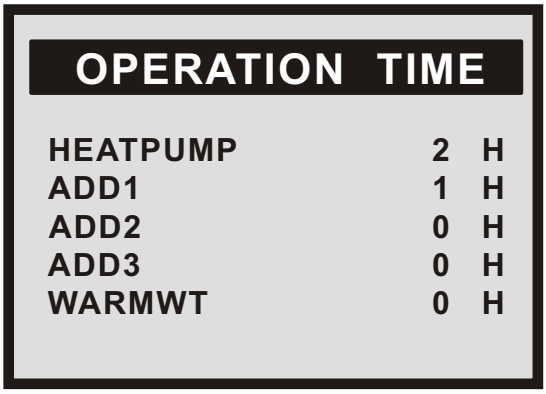


Table 3: Menu OPERATING TIME

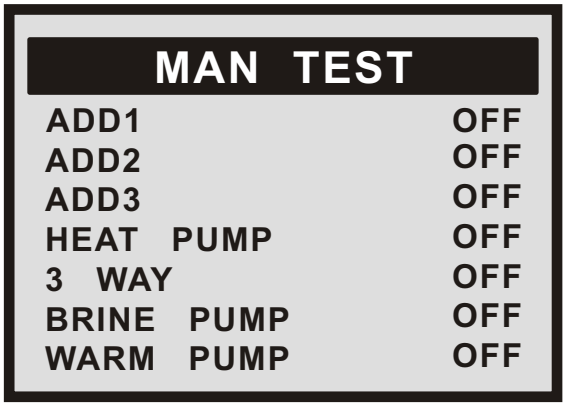
Menu Text	Description	Adjustable by:
HEATPUMP	Total operating hours of heat pump since installation. Operating time will not be reset to zero.	USER
ADD 1	Total operating hours of auxiliary heater (3kW) since installation. Operating time will not be reset to zero.	USER
ADD 2	Total operating hours of auxiliary heater (6kW) since installation. Operating time will not be reset to zero.	USER
ADD 3	Total operating hours of auxiliary heater (9kW) since installation. Operating time will not be reset to zero.	USER
WARMWT	Total operating hours of water heater since installation. Operating time will not be reset to zero.	USER

Menus

Sub-Menu RESET

Reset to factory setting value.

Sub-MenuMAN TEST



How to enter the Sub-Menu MAN TEST:

You need to choose the 'MAN TEST"on the main menu (INFORMATION)
And press the right button for 3 second .

The Sub-Menu MAN TEST contains ADD1 / ADD2 / ADD3 / HEAT PUMP / 3 WAY / BRINE PUMP / WARM PUMP ; You can choose ON / OFF to control the each part for testing.

Adjustments to be made regularly

Most settings will be made by the installation contractor in connection with installation. Adjustments to be made regularly by the user are the following:

- Selection of operating mode
- Adjustment of desired room temperature by changing the ROOM value.
- Adjustment of heat curve
- Adjustment of maximum and minimum values for supply line temperature

Adjustment of the value for HEAT STOP is possible. (Please refer to ”Adjustment of HEAT STOP value” on p. 33).

Heat Generation-General

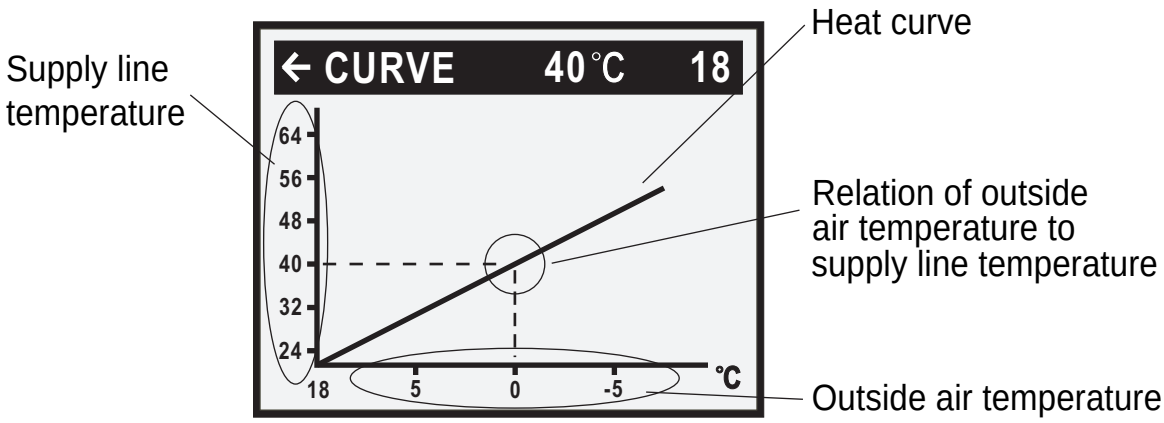
The indoor temperature should be adjusted by changing the heat curve of the installation. The control computer determines the correcttemperatur e of the water to be distributed to theheating system based on the heat curve.

The heat curve will be adjusted in connection with installation. It must be adapted later on, however, to obtain a pleasant indoor temperature under any weather condition. A correct heat curve reduces maintenance and saves energy.

The heat curve determines the supply line temperature depending on the outside air temperature. The lower the outside air temperature, the higher the supply line temperature. In other words, the temperature of the water feed to the radiators will increase exponentially as the outside air temperature falls.

If you select CURVE in the sub-menu named HEAT CURVE, a diagram will be displayed. It represents the relation of outside air temperature to supply line temperature. This relation is referred to as heat curve.

Adjustments to be made regularly

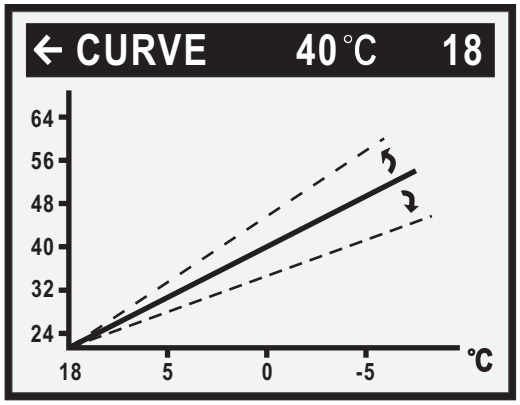


Adjustment of the CURVE value

The heat curve will be adjusted by the CURVE value. This value indicates the supply line temperature to the radiators at 0°C outside temperature. At outside air tempe-ratures lower than 0°C, the water sent to the radiators will be warmer than 40°C.
At outside temperatures higher than 0°C, the water will be colder than 40°C. When you increase the CURVE value, the heat curve will become steeper and when you reduce it, it will become flatter.

This is the most energy and cost efficient way to set the indoor temperature and should therefore be used for long term temperature settings. If you wish to make
a temporary change of temperature, you can simply change the ROOM value (see
”Adjustment of the ROOM value” on page 31).

Factory setting of CURVE value is 40°C, at an outside air temperature of 0°C. The value is adjustable between 22°C and 56°C



Change of value for CURVE

If you wish to change the CURVE value:

1 Open the main menu INFORMATION by pressing the right- or the left-hand button once.
You will find the cursor at the sub-menu named OPERATION
2 Press the ”down” button to move the cursor to the sub-menu called HEAT CURVE.
3 Press the right-hand button once to open the menu. You will find the cursor at the parameter CURVE
4 Open the selected parameter by pressing the right-hand button once.
5 Increase or reduce the preset value using the ”up” or ”down” button. You will see from the diagram how the gradient of CURVE changes.

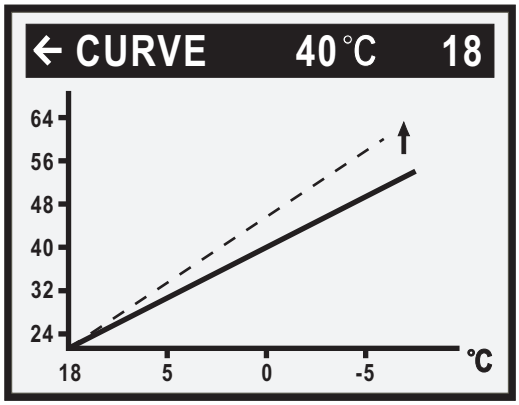
Press the left-hand button three times to return to the main menu.

Adjustments to be made regularly

When enter 'Room heat' mode, user could control compressor and electrical heater through regulate heat curve or DM (degree minute).
under a certain ambient temperature ,the time start of compressor is determined by degree minute(DM). Now we are giving two situations to explain.

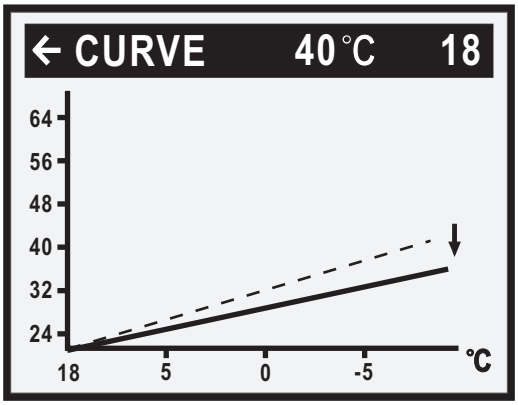
1.'start quickly' is determined by FEED(heat curve)
Suppose now the actual supply water's temperature is 25℃; regulate the heat curve to let the setting of water temperature to be a higher value such as 55℃,that is FEED25(55). At that time, DM (degree minute) decrease -30 per minute, when the DM reach -60, compressor will start right away.

(**Notice:** if the water temperature setting is lower than actual temperature of water supply, DM would turn to positive number, and then compressor does not start. Of course, you also can regulate the DM to be near the value for compressor start, such as -20.



turn it up

2. 'start slowly' is determined by FEED(heat curve)
Suppose now the actual supply water temperature is 25℃,if regulate the heat curve to let the setting of water temperature to be a lower value such as 30℃, that is FEED25(30); at that time, the DM would decrease -10 per minute, the time to reach -60 is becoming longer, only after some time, then compressor can start. You also can regulate the DM to be more far away from the value for compressor start, such as (-100)



curve is a little flat

When enter room heat mode, it needs customer to regulate the heat curve or DM (degree minute) according to own request. Please notice that room heat mode's precondition is that ambient temperature more than HEAT STOP's setting temperature (factory setting is 17℃, adjustable from 0 to 24℃); when supply water temperature is lower than minimum temperature setting of supply water, compressor start forcedly; when supply water temperature reaches minimum temperature setting of supply water, compressor shut forcedly

Adjustments to be made regularly

Adjustment of ROOM value

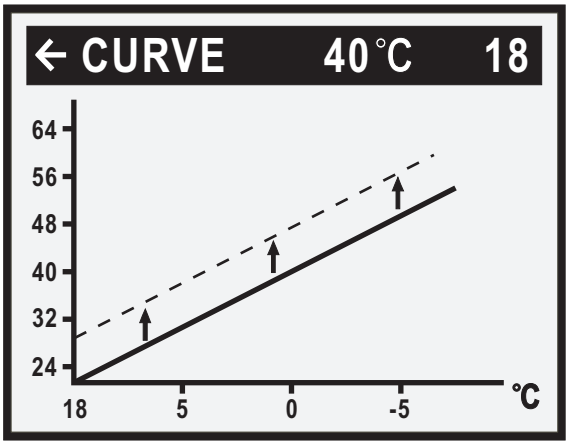
As mentioned above, you can also adjust heat curve and indoor temperature by changing the ROOM value. If you use ROOM value to adjust the heat curve, the gradient does not change, i.e. it doesn't become steeper or flatter. Instead, the whole curve is moved by 3°C for every degree by which the ROOM value is changed.

The relation supply line temperature to outside air temperature will not be affected. The supply line temperature will be increased or reduced by the same number of degrees all along the heat curve. See the following diagram.

Adjustment of the ROOM value should only be used for temporary changes of the indoor temperature. For long term settings, the CURVE value should be adjusted as this is the most energy and cost efficient way to set the indoor temperature.

For adjusting the heat curve, please refer to the chapter "Adjustment of the CURVE value" on page 29.

Factory setting of ROOM value is 20°C.



Changing the ROOM value

If you wish to change the ROOM value:

1 Press the "up" or "down" button once to open the ROOM value for adjustment.

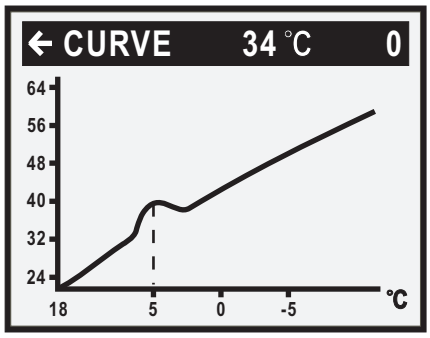
2 Increase or reduce the preset value using the "up" or "down" button so that the desired room temperature is reached. Wait for 10 seconds or press the left-hand button once to return to the main menu.

Adjustment of Part of the Heat Curve

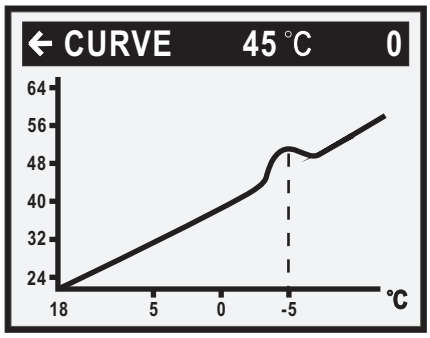
At outdoor temperatures between -5°C and +5°C part of the heat curve may need adjusting if the indoor temperature does not stay at the preset ROOM value. For this reason, the control system includes a function adjusting the curve at three outside temperatures: -5°C, 0°C, +5°C. This function will allow you to increase or reduce the supply line temperature, without affecting the heat curve, at three specific outdoor temperatures. If, for example, the outside temperature is -5°C,the supply line temperature will change gradually in the outdoor temperature range of 0°C to -10°C, maximum adjustment being reached at -5°C. The diagram below shows an adjusted CURVE-5. The point of maximum adjustment is clearly visible.

As we have seen, you can choose to adjust the heat curve at three specified outside air temperatures: -5°C, 0°C and +5°C. The supply line temperature can be changed by plus/minus 5 degrees.

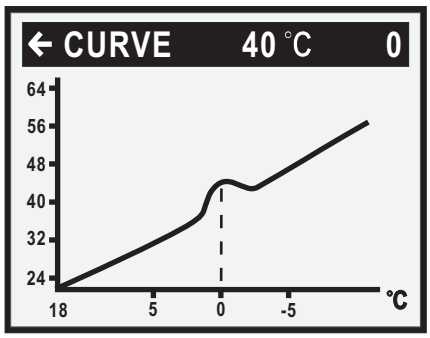
Adjustments to be made regularly



Change of the value for CURVE +5



Change of the value for CURVE -5



Change of the value for CURVE 0

If you wish to change a specific part of the heat curve:

1 Open the main menu INFORMATION by pressing the right- or left-hand button once.You will find the cursor at the sub-menu OPERATION.

2 Press the ”down” button to move the cursor to the sub-menu HEAT CURVE.

3 Open the selected menu by pressing the right-hand button once. You will find the cursor at the parameter CURVE.

4 Using the ”up” or ”down” button, select either CURVE 5, CURVE 0 or CURVE -5.

5 Open the selected curve by pressing the right-hand button once.

6 Raise or lower the value, using respectively the ”up” or ”down” button. To return to the main menu, press the left-hand button three times.

Adjustment of the MIN and MAX value

The MIN and MAX value is the lowest respectively highest value that is allowed for the supply line temperature. Adjusting the minimum and maximum supply line temperature is particularly important if your home has floor heating.If your house has floor heating and parquet floor, the supply line temperature should not be higher than 45°C. Else the floor might get damaged. If you have floor coils and stone tiles, the MIN value should be 22-25°C in summer when no heating is required – to obtain a comfortable floor temperature.

If there is a basement to your house, the MIN value should be adjusted to a suitable temperature in summer too, to avoid a humid and chilly basement. In such cases,the value for HEAT STOP needs being adjusted upwards.

If you wish to change the MIN or MAX value:

1 Open the main menu INFORMATION by pressing the right- or left-hand button once.
You will find the cursor at the sub-menu OPERATION

2 Press the ”down” button to move the cursor to the sub-menu HEAT CURVE

3 Open the selected menu by pressing the right-hand button once. You will find the cursor at the parameter CURVE.

4 Press the ”down” button to move the cursor to MIN.

5 Open the selected parameter by pressing the right-hand button once. The cursor is at MIN

6 Raise or lower the value, using the ”up” and ”down” button respectively.

7 Press the left-hand button three times to return to the main menu.

Repeat the procedure to change the MAX value, replacing MIN by MAX at step 4.

Adjustments to be made regularly

Adjustment of the HEAT STOP value

The HEAT STOP function stops all production av radiator heat when the outside air temperature is equal to or higher than the value entered for heat stop.When the heat stop function is activated, the circulation pump will be turned off except when warm water is being produced. Even if shut off, the pump will be"exercised" during 1 minute a day. Factory setting for heat stop is 17°C.(0 -24 °C adjustable)

If you wish to change the HEAT STOP value:

1 Open the main menu INFORMATION by pressing the right- or left-hand button once.
You will find the cursor at the sub-menu OPERATION

2 Press the "down" button to move the cursor to the sub-menu HEAT CURVE

3 Open the selected menu by pressing the right-hand button once.

4 You will find the cursor at the parameter CURVE.

5 Press the "down" button to move the cursor to HEAT STOP

6 Open the selected parameter by pressing the right-hand button once. The cursor moves to HEAT STOP

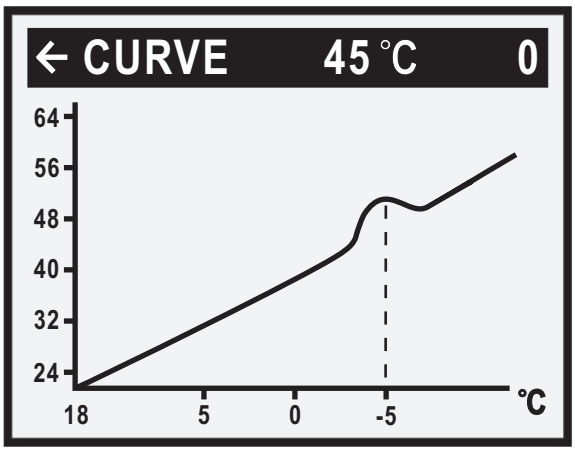
7 Raise or lower the value, using respectively the "up" or "down" button.

8 Press the left-hand button three times to return to the main menu.

Adjustments to be made regularly

Graph of recent changes in TEMPERATURE

All temperatures registered during the last hour can be viewed in the sub-menu TEMPERATURE in the shape of a graph. This will enable you to monitor changes in the different system temperatures.



There is a graph available for all temperatures, except for the ROOM temperature,where you can only view the setpoint value. The integral value that is displayed represents the heating system's energy balance.

If you wish to check the TEMPERATURE graphs:

1 Open the main menu INFORMATION by pressing the right- or left-hand button once.
You will find the cursor at the sub-menu OPERATION.

2 Press the "down" button to move the cursor to the sub-menu TEMPERATURE

3 Open the menu by pressing the right-hand button once.

4 You will find the cursor at the parameter OUT.

5 Press the "down" or "up" button to move the cursor to the desired temperature.

6 Open the selected value by pressing the right-hand button once. A graph will be shown in the display.

7 Move the cursor along the time axis using the "up" (plus) or the "down" (minus) button.
The exact temperature at the selected point of time appears at the top of the display.

8 Press the left-hand button three times to return to the main menu.

Maximum Return Line Temperature

The maximum return line temperature, i.e. temperature of the water returning from the heating system, should be adapted to each individual installation. The correct temperature value for your system will be entered by your installation contractor in connection with installation and can be adjusted later.

Warm Water Production

The temperature of the water distributed to the water heater is controlled by the regulating pressure switch and cannot be adjusted.

Reading of warm water temperature.

To check the actual warm water temperature on the display:

1 Open the main menu INFORMATION by pressing the right- or left-hand button once. You will find the cursor at the sub-menu OPERATION.

2 Press the ”down” button to move the cursor to the sub-menu called TEMPERATURE.

3 Open the menu by pressing the right-hand button once.

4 Press the ”down” button to move the cursor to the parameter WARMWATER.

5 Open the selected parameter by pressing the right-hand button for 3 seconds.

A graph will be shown of last hour’s warm water temperatures.

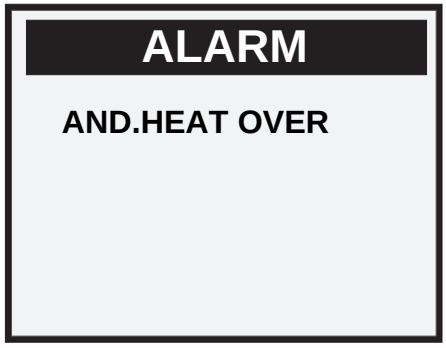
6 Press the left-hand button three times to return to the main menu.

The value displayed next to the parameter WARMWATER is the actual hot water temperature. The value in brackets is the temperature at which warm water production will start. When the actual temperature falls below that value, warm water production starts. The starting value is not adjustable.

Regular Checks

Check of Operating Mode

In the event of an alarm, The background light of LCD will flash and an alarm message will be displayed.

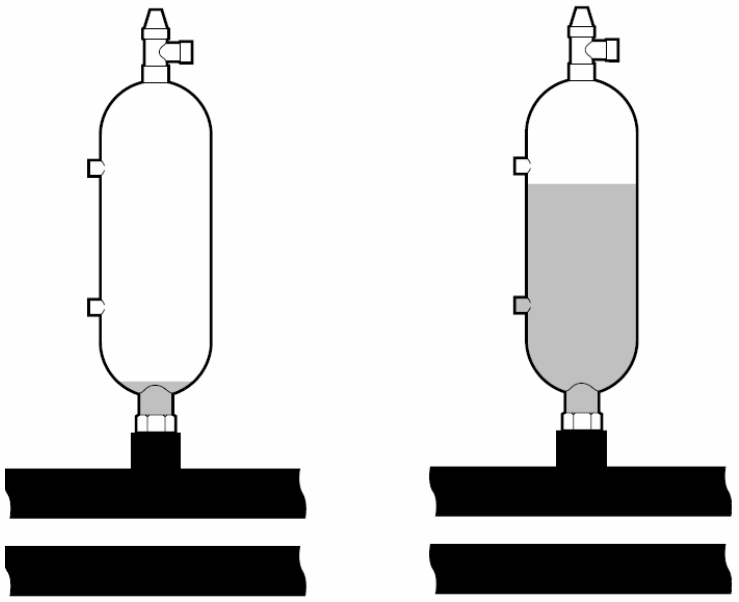


Check the alarm indicator regularly to make sure that the heat pump works properly. You would not always notice if there is something wrong, as the auxiliary heater would start automatically (provided, of course, operating mode AUTO was selected). For more information, please refer to the chapter ALARM MESSAGES on p. 38.

Checking the Brine Level in the Brine system

The Brine system must be filled with the correct volume of brine. Otherwise the heat pump unit risks being damaged.

Brine system liquid (brine) must be added if the brine level gets so low that it is no longer visible in the expansion vessel.



During the first month of operation the brine level might sink a little, which is quite normal. The brine level may also vary a bit, depending on the temperature of the heat source. Under no circumstances, however, shall the brine level be allowed to sink so much that it is no longer visible in the expansion vessel.

Call your installation contractor for refilling of Brine system liquid.

Regular Checks

Checking the Water Level of the Heating System

The pressure of the heating system should be checked once monthly. The pressure, shown on the external pressure gauge, should be 1-1,5 bar. If the value is below 0.8 bar with cold water in the heating system, more water must be added (applies to a closed expansion vessel). To find out where the pressure gauge is located.

You can use ordinary tap water for filling the heating system. In some rare cases the water quality would be unsuitable for this purpose (corrosive or calcareous water). In case of doubt, we would recommend that you call your installation contractor.

Don’t use any water treatment additives for the heating system!

Checking the Safety Valves

Both safety valves of the heating system should be checked at least four times a year to prevent lime deposits to clog the mechanism. To find out where the safety valves are located.

The safety valve of the water heater protects the closed heater against positive pressure. It is fitted on the cold water inlet line, its outlet opening facing down-wards. If the safety valve is not checked regularly, the water heater might be damaged. It is quite normal that the safety valve lets out small amounts of water when the water heater is being charged, especially if a lot of warm water was used previously.

To check the safety valves, give the cap a quarter of a turn clockwise until the valve lets out some water through the overflow pipe.

If a safety valve does not work properly, it must be replaced. Check with your installation contractor.

The opening pressure of the safety valve is not adjustable.

In the Event of Leakage

In the event of leakage in the warm water lines between unit and water taps, the shut-off valve on the cold water inlet line should be closed immediately.
Call your installation contractor. In the event of leakage in the Brine system circuit, turn off the heat pump and call your installation contractor immediately.

Alarm Messages

In the event of an alarm message, try to re-start the unit with the safety switch.

If this does not work, try to solve the problem with the help of the table below. Call your installation contractor if you need help.

Table : Alarm Messages

Message	Signification	Cause	Action
RETURN TEMP	Return line temperature sensor error; All operation stopped, except circulation pump of heating system.	Sensor disconnected; Sensor defective.	Check the connections,the wire, or change it .
FEED IN TEMP	Supply line temperature sensor error; All operation stopped, except circulation pump of heating system.	Sensor disconnected; Sensor defective.	Check the connections,the wire, or change it .
BRINE OUT TEMP	Brine out temperature sensor error / Defrost temperature sensor error (for air source heat pump) .	Sensor disconnected; Sensor defective.`	Check the connections,the wire, or change it .
OUTDOOR TEMP	Outside air temperature sensor error;	Sensor disconnected; Sensor defective.	Check the connections,the wire, or change it .
ROOM TEMP	Room air temperature sensor error;	Sensor disconnected; Sensor defective.	Check the connections,the wire, or change it .
CMP TEMP	Compressor exhaust temperature sensor error;	Sensor disconnected; Sensor defective.	Check the connections,the wire, or change it .
WARM WATER TEMP	Water tank temperature sensor error;	Sensor disconnected; Sensor defective.	Check the connections,the wire, or change it .
HIGH PRESS	All operation stopped; High pressure switch cut out; compressor is stopped; No warm water is produced	The wire disconnectted; Refrigerance leakage, lack of refrigerance; water flow stop in the room cycle.	Check the wire connection; Refrigerance recharge; Check the water cycled pump for the room heating system; Or call your installation contractor.
LOW PRESS	All operation stopped; Low pressure switch cut out; compressor is stopped; No warm water is produced	The wire disconnectted; No refrigerance (leakage out); Pipe was plugged.	Check the wire connection; Refrigerance recharge; Check the pipe system; Or call your installation contractor.
CMP OVER	All operation stopped; Compressor overload protection	The actual current over the contactor 's allowed current.Compressor current too large;or the AC contactor current adjust too small.(6K,8K should be adjust to 11A; 10K,12K should be adjust to 14A; 16K,20K,25K,should be adjust to 16A)	Check the compressor; Adjust the AC contactor's current range; Or call your installation contractor.
ADD HEAT OVER	All operation stopped; Electrical heater overheat .	The temperature of electrical heater over the max allowed temperature. Water flow too low or stoped.	Check the water cycled pump for the room heating system; Or call your installation contractor.
WTPUMP OVER	All operation stopped; Water pump overheat .	The temperature of the water pump (room heating cycle) over the max allowed temperature.No water in the cycle system.	Check the water cycled pump for the room heating system; Or call your installation contractor.
CMP AIR OVER	All operation stopped; Compressor exhaust overheat .	Lack of refrigerance.	Refrigerance recharge; Or call your installation contractor.
POWER SUPPLY	Phase error;	For three-phase, the phase order reversed or wrongly connected. For single-phase, the " three-phase option port " in the circuit board is not connected or loose.	Check the connections,the wires. Or Call your installation contractor

The following table only applies to installations using ground water as brine system liquid.

Message	Signification	Cause	Action
BRINE OUT	Temperature of brine leaving heat pump is lower than setpoint value. Compressor is stopped and no warm water is produced.	The minimum Brine sytem temperature has been reached	The system resets automatically when temp. has risen to setpoint value
BRINEFLOW LOW	Flow switch not active at latest compressor start. Compressor is stopped and no warm water is produced.	Brine sytem flow is too low.	Call installation contractor

Terminology and Abbreviations

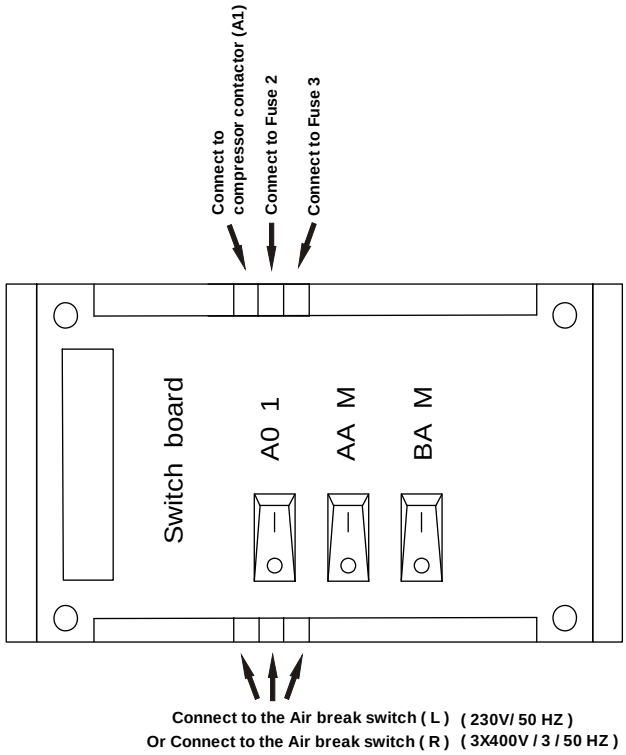
Evaporate	In the evaporator, energy from the heat source is absorbed by the refrigerant passing through the evaporator. The refrigerant turns into gas. (See "Heat Pump Principle" on p. 4).
INTEGRAL	INTEGRAL is the heat balance of the heating system. Production of heat is regulated acc. to a calculated heat demand value. This value is determined by comparing the actual supply line temperature with its calculated (setpoint) value. The difference between the two values is multiplied by the time during which the difference is active. The resul-ting value is referred to as the integral. The integral value is automatically established when heat is being produced. The value can be viewed in the sub-menu TEMPERATURE.
Compressor	The compressor raises temperature and pressure of the the refrigerant (See "Heat Pump Principle" on p.4).
Condenser	In the condenser ,the r efrigerantreleases its heat ener gyto the heatingcircuit. (See"Heat Pump Principle" on p.4)
CURVE	The CURVE value will be adjusted on the control panel. The value indicates the temperature of the water distributed to the radiators (supply line temperautre) at an outside air temperature of 0°C.
Brine system	A water-based mixture transporting heat energy from the heat source to the heat pump. (See "Heat Pump Principle" on p. 4).
Brine system	Circuit filled with Brine sytem (see above), transporting heat energy from heat source to heat pump. (See "Heat Pump Principle" on p. 4)
Refrigerant	Circuit in the heat pump filled with refrigerant that by evapo-ration, compression, and circuit condensation absorbs heat energy from the Brine sytem circuit and releases it to the Heating circuit.
Refrigerant	Liquid absorbing energy from the Brine sytem circuit and releasing it to the heating circuit. (See "Heat Pump Principle" on p. 4).
Radiator	Heating element
Control	The control computer regulates the whole installation. All system settings and computer temperature changes are stored and registered in the computer. Settings are adjusted via the graphic display on the control panel.
Heating circuit	The heating circuit receives heat energy from the refrigerant circuit and carries it to the water heater or radiator/ floor coil systems. (See further"Heat Pump Principle" on p.4).
Heat curve	The heat curve is the control computer's instrument for determining the required supply line temperature of the heating system. Indoor temperature will be adjusted by adjustment of the CURVE value

Function

Function of manual switch board:

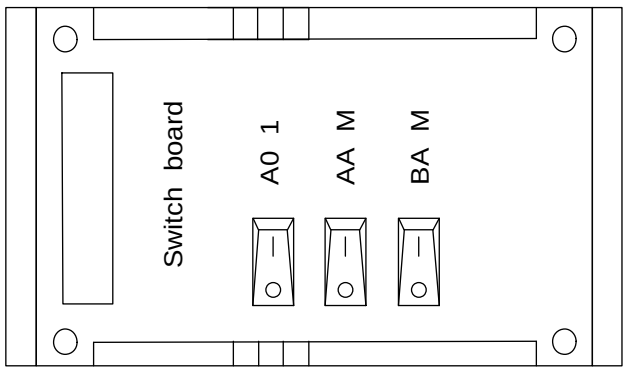
When test or repair the machine, the compressor, Ground water cycle pump and water cycle pump can be force manual startup.

A0 1 : Control the compressor;
AA M : Control the Ground water cycle pump;
BA M : Control the water cycle pump.


Connect to compressor contactor (A1)
Connect to Fuse 2
Connect to Fuse 3
Switch board
A0 1
AA M
BA M
Connect to the Air break switch (L) (230V/ 50 HZ)
Or Connect to the Air break switch (R) (3X400V / 3 / 50 HZ)

Initial state

The initial state of the manual switch board are such buttons (A0 , AA , BA), all of them are off.(see the picture).
When the machine is running normally,the switch board must be in initial state.

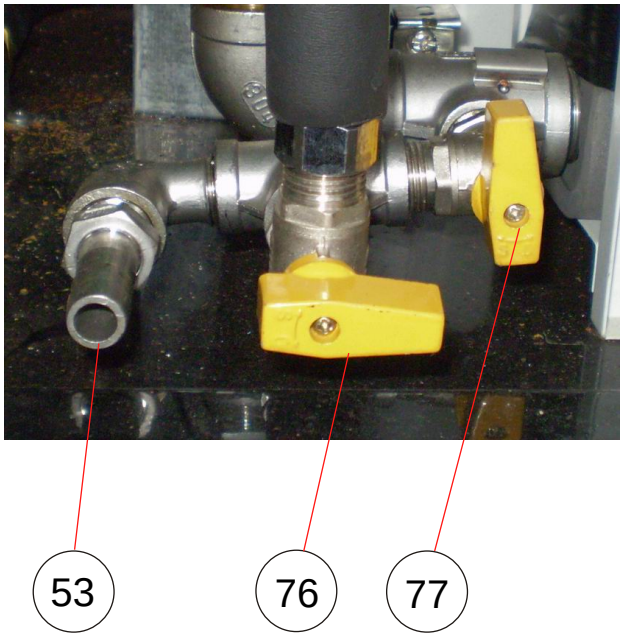


NOTE!

The manual switch board is use only if the necessary for test or repair. when the machine is running normally,the switch board must be in initial state.

Draining, heat medium side

Close the shut-off valves in heating medium system. Open the drain valve (77). A small amount of water runs out, however, to fully empty the heating medium side requires the connector that joins the heating medium side and the connection on the heat pump VB-flow to be loosened a little to allow air to enter so the remaining water can run out. When the heating medium is empty the requisite service can be carried out.

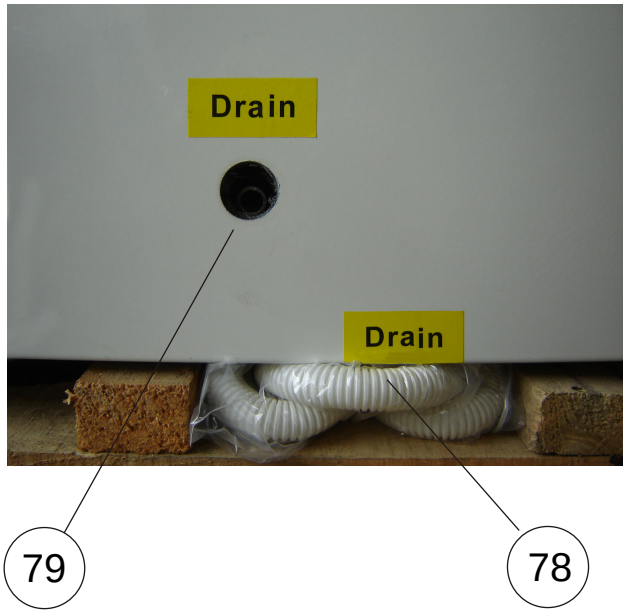


Draining, collector side

When replacing the brine pump or drive side or when cleaning the pump, the shut-off valves in the collector system should be closed. The hose between the top of the evaporator and the brine pump is loosened on the evaporator. The loose hose end can now be bent down and emptied in a small bowl. Now loosen the connection to **KB** a little to allow air to enter so the heat pump's collector side is emptied completely. When the circuit is empty the requisite service can be carried out.

Draining, water tank

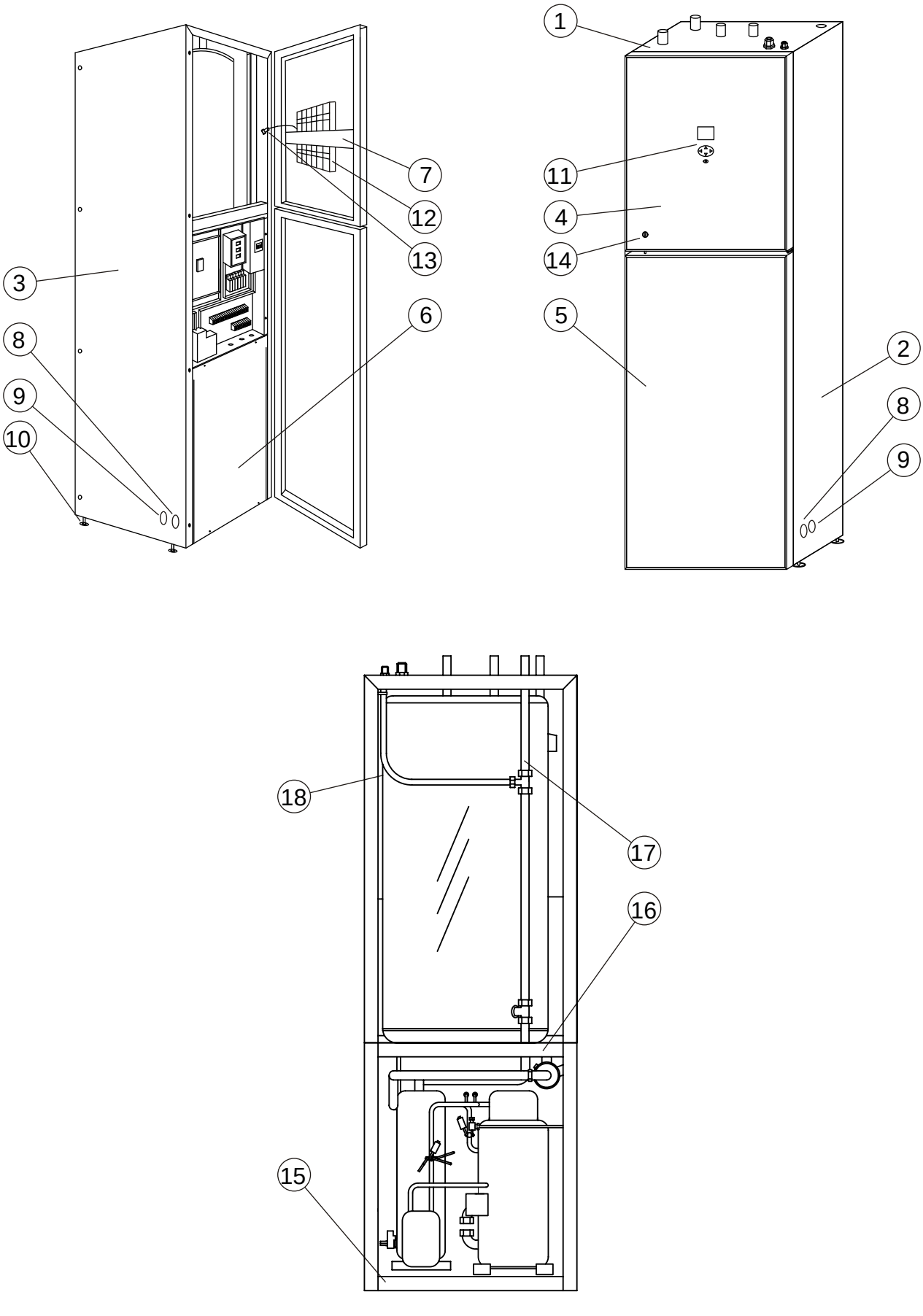
First,close the drain valve (77).And then open the drain valve (76). When the water tank is empty the requisite service can be carried out.



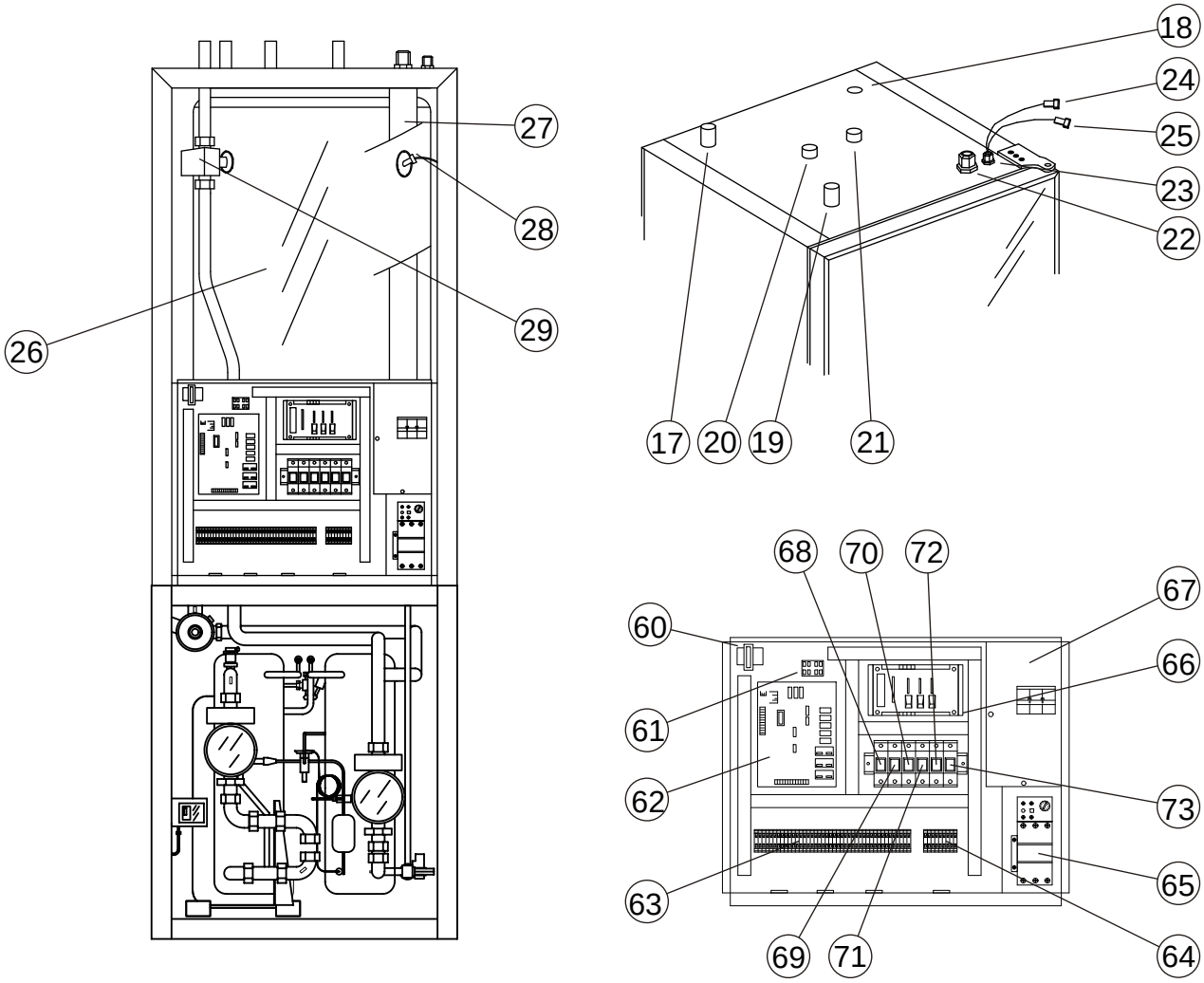
Draining, the chassis

The drain-pipe for the chassis is already assembled in advance before leaving the factory. The consumer is required to place the hose at appropriate location.

If the operating disturbance cannot be rectified by means of the above, an installation engineer should be called.

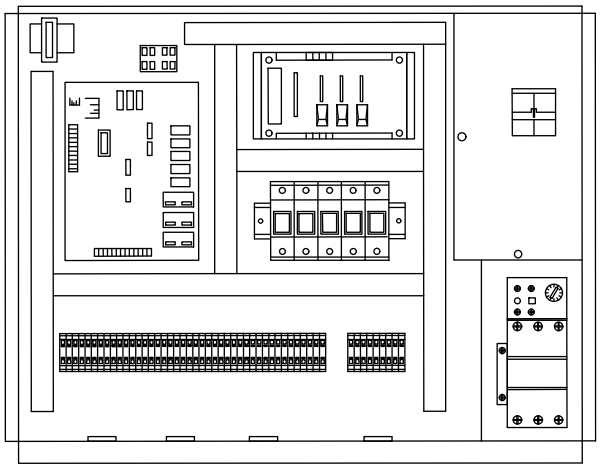


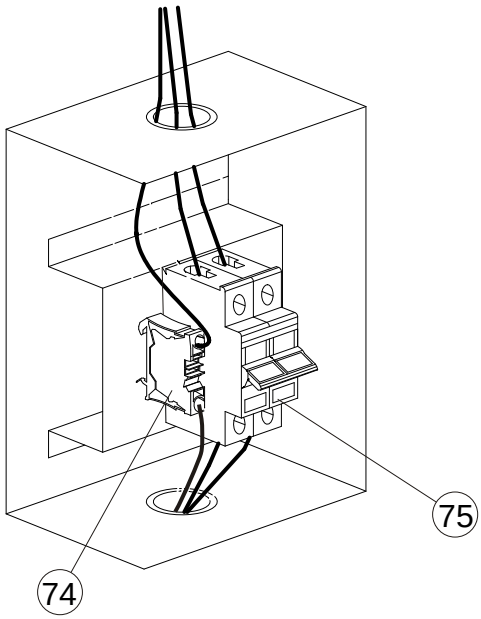
Please Note : The picture for reference only !



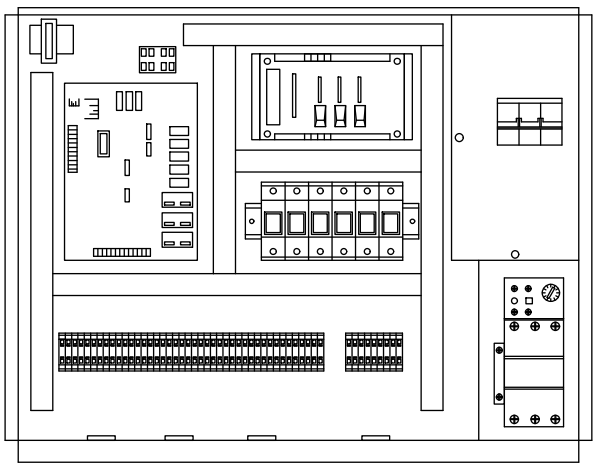
Please Note : The picture for reference only !

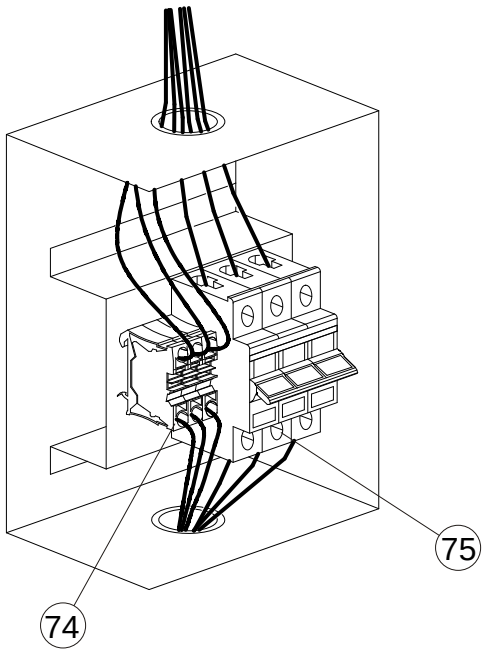
230 V /50 HZ





3X400 V / 3 / 50 HZ





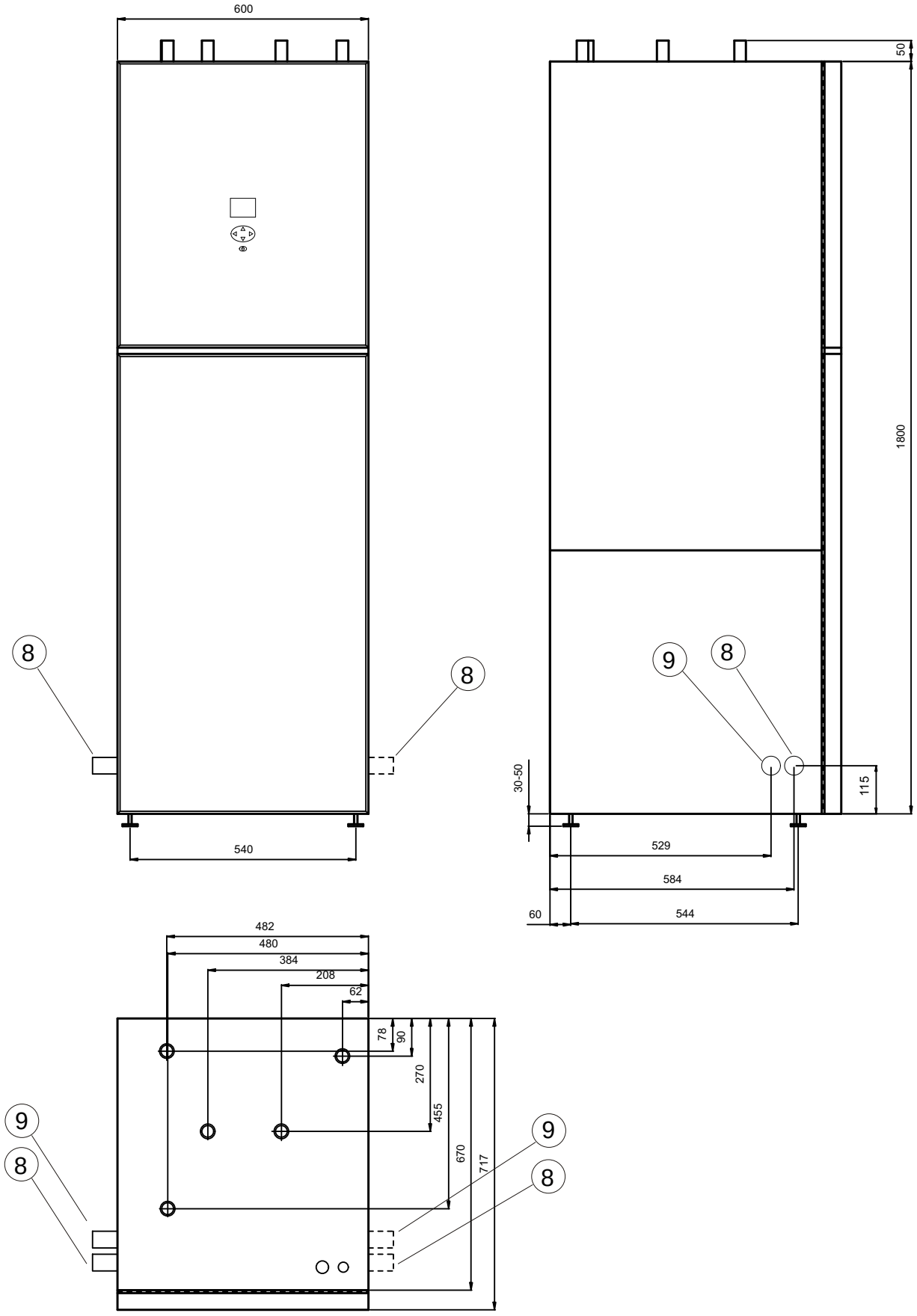
Please Note : The picture for reference only !

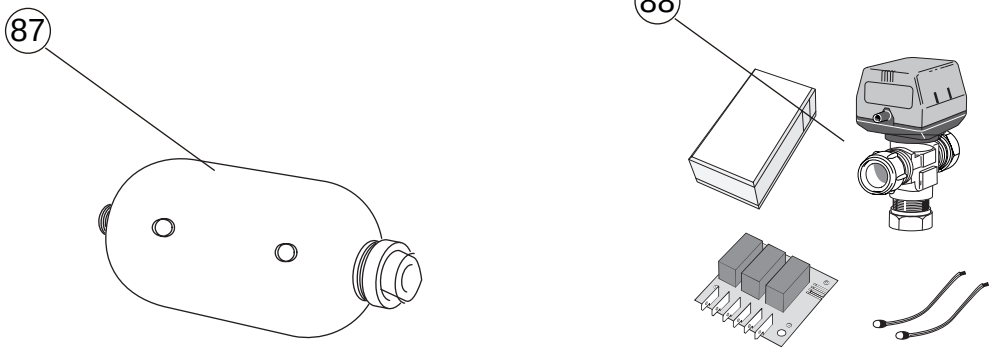
45 List of components

1 Top board
2 Right side board
3 Left side board
4 Glass upper door
5 Glass lower door
6 Front board
7 Board for fixing control panel
8 Collector,brine out
9 Collector,brine in
10 Stainless steel adjustable feet
11 Control panel
12 Control panel Box
13 Connecting wire of control panel
14 Door lock
15 Chassis
16 Sound insulation board
17 Connection,heating return Ø 28 mm
18 Level vessel,connection /1 inch
19 Connection,heating flow Ø 28 mm
20 Cold water inlet
21 Hot water outlet
22 Power cord connection hole
23 Temperature sensor connection hole
24 Room temperature Sensor connection
25 Outside air temperature sensor connection
26 Water tank
27 wire groove
28 Temperature sensor (Water Tank)
29 Three-way valve for waterflow
30 Automatic vent valve
31 Electrical Auxiliary heater
32 Brine pump (cooling medium pump)
33 Connecting pipe with variable diameter
34 Adjustable pressure switch
35 Evaporator
36 Condenser
37 Heating medium pump
38 Expansion valve
39 Pressure releasing valve
40 Drying filter
41 Oil tank
42 High pressure pressostat
43 Valve
44 Compressor
45 Low pressure pressostat
46 Low pressure needle valve
47 High pressure needle valve
48 Brine in pipe
49 Brine out pipe
50 Heating return pipe
51 drainpipe for Water tank
52 Heating flow pipe
53 Waterspout
54 Temperature sensor (heating flow)
55 Temperature sensor (Brine in)
56 Temperature sensor (Electrical auxiliary heater)
57 Temperature sensor (Brine out)
58 Temperature sensor (Compressor gas outlet)
59 Temperature sensor (Heating return)
60 Transformer
61 Neutral line common terminal
62 Circuit board
63 1.5mm^{2}terminal
64 2.5mm^{2}terminal
65 AC contactor
66 Switch board
67 Air break switch cover
68 Fuse 1 for 3 way valve
69 Fuse 2 for Ground water cycle pump
70 Fuse 3 for Water cycle pump
71 Fuse 4 for Electrical heater 1
72 Fuse 5 for Electrical heater 2
73 Fuse 6 for Electrical heater 3
74 6mm^2 terminal
75 Air break switch
76 Draining valve for water tank
77 Draining valve for heating medium
78 Draining pipe for the chassis
79 Draining hole
80 Room temperature sensor
81 Ourside air temperature sensor
82 Connecting Brine with insulation
83 conex connectors
84 Particle filters
85 drainpipe
86 draining connector
87 Level vessel
88 Adjustable three-way valve for waterflow

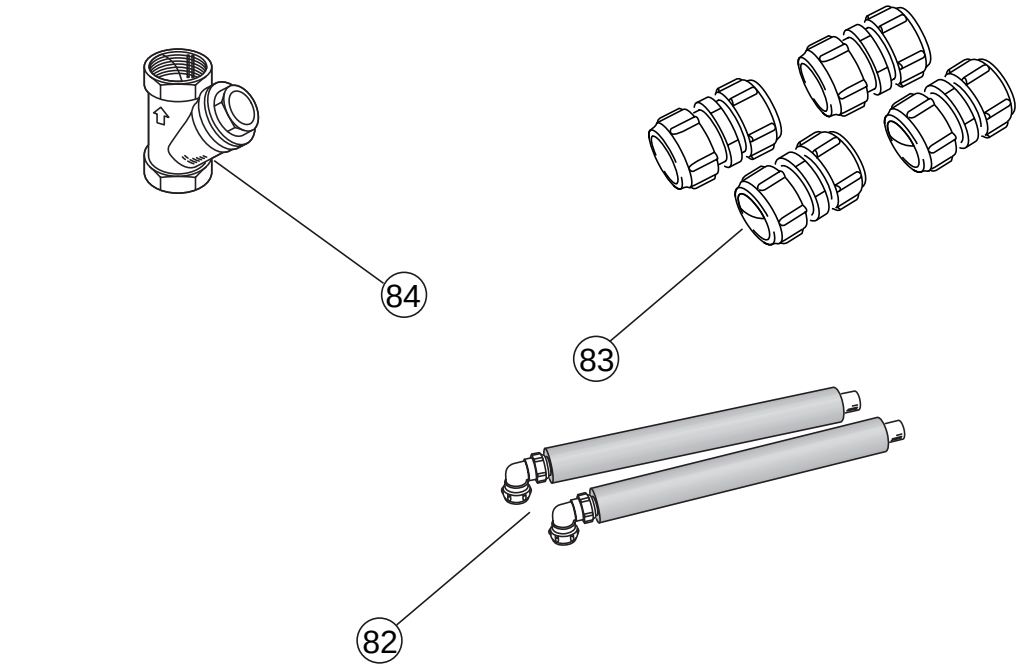
Please Note : The List for reference only !

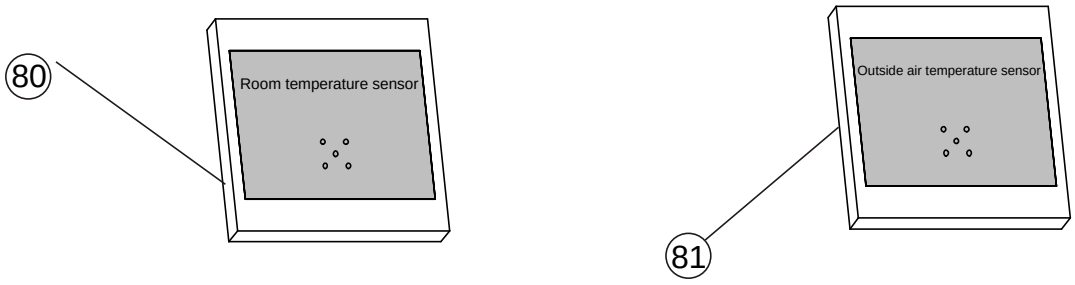
Dimensions and setting-out coordinates

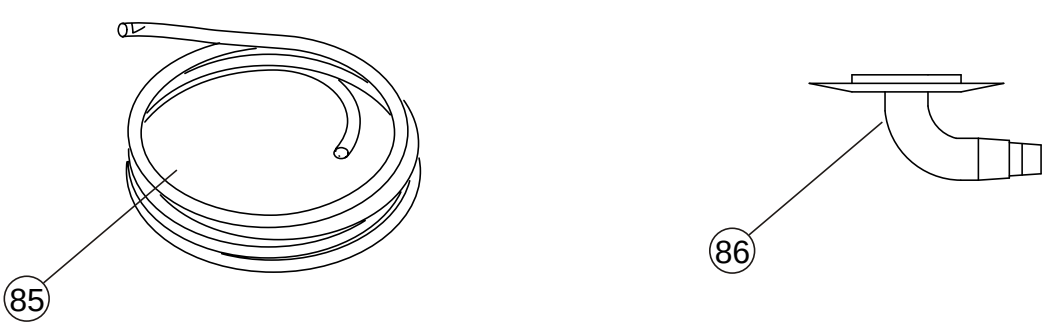




Enclosed kit







Technical specifications 230 V

CE IP 21 Refrigerant : R410A

Type (BWA-SS SERIES)		6	8
Heating Capacity at 7/35 °C	(KW)	5.9	8.15
Heating Power Input at 7/35 °C	(KW)	1.44	1.95
Operational voltage	(V)	230 V / 50 HZ	
Starting current, compressor	(A)	21	24
Heating current, compressor	(A)	6.8	8.7
Operating curr. incl. immersion heater 6 kW	(A)	14	14
Output, brine pump	(W)	151	151
Output, heat medium pump	(W)	151	151
Connection brine o.d. ø	(mm)	28	
Connection heating medium, o.d. ø	(mm)	28	
Water tank inlet/outlet, o.d. ø	(inch)	28	
Required ceiling height	(mm)	1980	
Volume, water heater	(litres)	150	
Volume, spiral copper pipe	(litres)	7.3	
Max pressure in storage heater	(MPa)	0.9 (9 bar)	
Max pressure in spiral copper pipe	(MPa)	0.25 (2.5 bar)	
Refrigerant quantity (R410A)	(kg)	1.25	1.15
Brine flow	(l/s)	0.28	0.39
Max pressure collector system	(bar)	3	
Operating temperature collector system	(°C)	-12 +20	
Heating medium flow	(l/s)	0.41	
Max temp. (flow/return circuit)	(°C)	68/55	
Difference pressostat HP	(bar)	-7	
Cut-out value pressostat HP	(bar)	40	
Difference pressostat LP	(bar)	+1	
Cut-out value pressostat LP	(bar)	0.5	

Technical specifications 3 x 400 V

CE IP 21 Refrigerant : R410A

Type (BWA-SS SERIES)		10	12	16
Heating Capacity at 7/35 °C	(KW)	9.85	12.6	16.0
Heating Power Input at 7/35 °C	(KW)	2.45	3.04	3.90
Operational voltage	(V)	3 x 400 V / 3 / 50 Hz		
Starting current, compressor	(A)	30	30	35
Heating current, compressor	(A)	4.8	6.35	7.0
Operating curr. incl. immersion heater 9 kW	(A)	14	14	14
Output, brine pump	(W)	151	151	205
Output, HC pump	(W)	151	151	151
Connection brine o.d. Ø	(mm)	28		
Connection heating medium, o.d. ø	(mm)	28		
Water tank inlet/outlet, o.d. ø	(mm)	28		
Required ceiling height	(mm)	1980		
Volume, water heater	(litres)	150	150	200
Volume, spiral copper pipe	(litres)	9.8	9.8	12.26
Max pressure in storage heater	(MPa)	0.9 (9 bar)		
Max pressure in spiral copper pipe volume	(MPa)	0.25 (2.5 bar)		
Refrigerant quantity (R410A)	(kg)	1.45	1.50	1.65
Brine flow	(l/s)	0.55	0.55	0.55
Heating medium flow	(l/s)	0.49	0.57	0.75
Max pressure collector system	(bar)	3		
Operating temperature collector system	(°C)	-12 +20		
Max temp. (flow/return circuit)	(°C)	68/55		
Cut-out value pressostat HP	(bar)	40	40	40
Difference pressostat HP	(bar)	-7		
Cut-out value pressostat LP	(bar)	0.5		
Difference pressostat LP	(bar)	+1		
Enclosure class		IP 21		